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THE

NATIONAL CYCLOPÆDIA

OF

USEFUL KNOWLEDGE.

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VOL. XII.

THECA—ZYGOPHYLLACEÆ.

LONDON:
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1851.

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THE

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USEFUL KNOWLEDGE.

THECA.

THECA, a term in vegetable anatomy. It was applied by Grew to that part of the stamen which contains the reproductive granules and which is now generally called the Anther. It is also extensively employed in cryptogamic botany. Among the ferns, it is applied, in common with the terms capsule, conceptacle, and sporangium, to those little granules which constitute the masses called sori. In the *Equisetaceæ* it expresses the assemblage of cases which are attached to scales arranged in a conical manner.

The same term is used to indicate the kidney-shaped two-valved cases that contain the reproductive matter of *Lycopodiaceæ*, and also the urn-like organs that enclose the sporules of mosses. It is by some writers still further extended, and used to express the parts that contain the sporules in Lichens and Fungi.

THECA (in Anatomy) is a term commonly applied to the strong fibrous sheaths in which certain soft parts of the body are enclosed. Thus the *Theca vertebralis* is the sheath of dura mater in which the spinal chord is enclosed; and the canals through which many of the long tendons of the muscles of the hand and foot run are called thecæ. These last are always lined by a synovial membrane, and contain a small quantity of fluid, by which the sliding of the tendons is facilitated.

THE'CODONTS. Professor Owen, in his 'Report on British Fossil Reptiles,' observes that among the inferior or squamate saurians there are two leading modifications in the mode of attachment of the teeth, the base of which may be either anchylosed to the summit of the alveolar ridge, or to the bottom of an alveolar groove, and supported by its lateral wall. These modifications are, he remarks, indicated respectively by the terms 'acrodont' and 'pleurodont.' A third mode of fixation is presented by some extinct saurians, which in other parts of their organisation adhere to the squamate or lacertine division of the order, the teeth being implanted in sockets, either loosely or confluent with the bony walls of the cavity: these Professor Owen has, in his 'Odontography,' termed the *Thecodont Lacertians*, the most ancient of all saurians belonging to this group. Among the thecodont saurians the following genera (fossil) may be mentioned, viz., *Thecodontosaurus*, *Palæosaurus*, and *Cladyodon*.

THEISS.

THECOSO'MATA, M. de Blainville's name for a group of mollusks constituting his first family of *Aporobranchiata*, the first order of his second section of his second subclass (*Paracephalophora Monoica*). Genera, *Hyalæa*, *Cieodora*, *Vaginella*, *Cymbulia*, and *Pyrgo* (fossil).

THEFT. [LARCENY.]

THEIN, a neutral vegetable principle obtained from common tea, and supposed to be identical in its nature with caffein, the peculiar principle of coffee. To prepare it, a decoction of tea is mixed with excess of solution of di-acetate of lead. The solution, filtered from the precipitate formed, is to be treated with sulphuretted hydrogen to remove the excess of lead, filtered, evaporated to a small bulk, and neutralised by ammonia; the thein crystallises on cooling, and is to be purified by animal charcoal. It forms tufts of white delicate silky needles, which have a bitter taste, melt and lose water when heated, and sublime without decomposition. It is soluble in about 100 parts of cold water and more soluble in boiling water, or water slightly acidified. According to Liebig the formula representing its composition is $C^8 H^5 N^2 O^2$.

THEISS (*Tisza*, *Tisa*), the ancient *Tybiscus*, or *Tibisis*, a river of Hungary, is formed by the Black Theiss and the White Theiss, which rise in the Western Carpathians (the former from Mount Czerna Gora, the latter from Mount Pietros near the source of the Pruth), and unite their waters in 48° 3′ N. lat. 24° 14′ E. long. From this point the Theiss flows through a mountainous country in a general western direction, but in a very tortuous course, to Tokay, receiving a great number of mountain streams on each bank. At Tokay it leaves the hill country and enters the great plain of Hungary, through which it flows first S.W. as far as Szolnok, and thence nearly due S. past Csongrad, Szegedin, and O'Becse to its entrance into the Danube on the left bank nearly midway between Peterwardein and Belgrade. The banks of the river are excessively swampy and boggy except in the neighbourhood of Csongrad and the towns named, which are almost the only points passable for artillery between Tokay and the Danube. The stream is extremely sluggish, but deep enough for small steamers. The navigation is slow in consequence of the perpetual windings of the river; so much is this the case that, between Szolnok and Szegedin,

a distance in a straight line of little over 60 miles, a light boat of 42-horse power is 17 hours making the passage, even with the current. The soil along the river banks is of the richest quality, but the pestilential atmosphere is fatal to colonisation. The embankment of the river and the draining of the marshes by lateral canals, would create millions of acres of the finest wheat-land in the world. The whole length of the Theiss is above 600 miles. Its principal feeders on the left bank are the Szamos, the Körösz, the Marosch, the Aranka, and the Bega, called in its lower course the Karos—on the right, the Bodrog, the Szajo, the Zagyva, and the Canal of the Emperor Francis. [BACS.] Of all European rivers the Theiss is said to abound most in fish.

THELI'DOMUS, a genus of shelled mollusks, placed by Mr. Swainson under his family *Trochidæ*, in the subfamily *Rotellinæ*. Example.—*Thelidomus Braziliensis*.

Respecting this curious mollusk Mr. Swainson thus writes :— 'Among a considerable number of freshwater *Planorbi*, all of one species, which were sent to us from Brazil, we picked out two helix-looking shells, so precisely of the same olive-brown colour, and of the same size, as the others, that none but a conchologist would have been led to examine them. They appeared in fact like two little land-snails of the subgenus *Zonites*, that had fallen into the water where the *Planorbi* had been found, their outside being discoloured, and covered with little particles of dirt and sand. On placing them however under the magnifier, a conchologist alone can judge of our astonishment at finding that the whole of the shell was actually composed of little stones and grains of sand only, agglutinated together, yet with so much skill by the animal, that the regular turns of the volutions of the spire, and the form of the umbilicus, were most accurately preserved; they were, in short, freshwater carriers—absolute counterparts of their marine brethren, *Onustus*. As we can find no notice nor even allusion to such an extraordinary genus of shells in any writer, we have considered it new, and affixed to it the name of *Thelidomus*.'

THELLUSSON, PETER, was the son of Isaac de Thellusson, ambassador from Geneva to the court of Louis XV. He fixed his residence in London about the middle of the 18th century, and accumulated an immense fortune as a merchant. He died on the 21st of July, 1797.

His property consisted of a landed estate of about 4000*l*. a year, and of personal property to the amount of about 600,000*l*. This property he devised and bequeathed to trustees upon trust for accumulation and investment in the purchase of lands during the lives of his sons, grandsons, and the issue of sons and grandsons living, or in *ventre sa mere*, at the time of his death, and the lives of the survivors and survivor of them; and after that period, to be conveyed to the lineal descendants of his sons in tail male.

It had been long understood to be the rule of law that property might be rendered inalienable, during lives in being at the time of the creation of the trust, that is, where the trust is created by will, at the time of the death of the testator. This period was afterwards extended so as to allow for the cases of infancy, and of a child in *ventre sa mere*; but it was for some time questioned whether a term of twenty-one years might in all cases be added to the period of suspension, though it has since been determined that it may.

This will, which, in the events that happened, had the effect of postponing the enjoyment of the bulk of the estate till the expiration of nine lives in being at the time of the testator's death, was, after many hard struggles, occasioned rather by the immense value of the property (which it was computed would have amounted, with the expected accumulations, to upwards of 18,000,000*l*.), than by any new difficulty in the principle, finally established by the decision of the House of Lords on the 25th of June, 1805. ('Thellusson *v.* Woodford;' 11 Ves., 112.)

The case of Thellusson *v.* Woodford gave rise to the act of the 40 Geo. III., c. 98, 'for restraining all trusts and directions in deeds or wills whereby the profits or produce of real or personal estates shall be accumulated and the beneficial enjoyment thereof postponed beyond the term therein limited.' For the provisions of this act, the act must be consulted; and see the cases on it (9 Ves., 136; 4 Madd., 275; 12 Ves., 295; 4 Russ., 403).

THELPHU'SIANS, M. Milne Edwards' name for a tribe of brachyurous crustaceans belonging to his family of *Catometopes*, having, as he observes, considerable analogy with the *Cancerians*, and evidently forming the passage between them and the *Gecarcinians*, or Land Crabs. All the known species live in the earth near the banks of rivers or in humid forests; bearing a strong analogy to the Land Crabs.

M. Milne Edwards divides the tribe into three sections, embracing the genera *Thelphusa*, *Roscia*, and *Trichodactylus*.

THELWALL, JOHN, son of a silk-mercer, was born July 27, 1764, in Chandos Street, Covent Garden, London. He seems to have received but little education. His father died while he was nine years old. On leaving school he was employed in the shop which was carried on by his mother, and subsequently apprenticed to a tailor, though his aspirations were to become an actor or an artist. He did not remain long with the tailor, and at the suggestion of Mr. Holt of the Chancery bar, who had married his sister, he turned his attention to the law, but after several years' study he abandoned it, and in his 22nd year embraced literature as a profession.

In 1787 he published by subscription poems on several subjects, in 2 vols., which introduced him to some valuable friendships and to the editorship of a magazine. Being now a prosperous man, he married and took a house near the Borough hospitals, where he ardently studied anatomy, physiology, and chemistry, under Mr. Cline, Dr. Haighton, and Dr. Babington. He began his career as an orator, before he was twenty years of age, at the Society of Free Debate held at Coachmakers' Hall. He joined in the political struggles of the period by becoming a member of the Cor-

responding Society, where his boldness and fluency of speech attracted the notice of the leading men of the day. With Hardy and Horne Tooke [TOOKE, HORNE] he was tried for high treason, and acquitted. Thelwall's trial lasted five days. On his acquittal he lectured on politics and political history for several years, when, after a retirement of two years in Wales, he began his career in 1801 as a lecturer and tutor in elocution, and in the application of elocutionary science to the cure of stammering and other impediments to speech. His success was great. He communicated papers to the 'Medical and Physical Journal,' on defective and difficult utterance, and to the 'Monthly Magazine,' on elocution and its kindred sciences. He died at Bath, Feb. 17, 1834.

Besides magazine contributions and pamphlets, he wrote poems on several subjects, in 2 vols., already mentioned; 'Poems written in the Tower and in Newgate,' 1 vol.; 'The Tribune,' 3 vols., and 'Political Miscellanies,' 1 vol.; 'A Letter to Mr. Cline, on Stammering,' 1 vol.; 'The Peripatetic,' 3 vols.; and a novel, entitled 'The Daughter of Adoption.'

THEMIS, a Greek divinity, was, according to Hesiod and Apollodórus, a daughter of Úranus (Heaven) and Gæa (Earth). She appears in Homer as a personification of the order of things sanctioned by usage or by law, and as the goddess who rules in the assemblies of the people. (Homer, 'Odyss.,' ii. 68, &c.)

THEMI'STIUS, of Paphlagonia, was a distinguished orator in the fourth century after Christ. Constantius made him a senator; Julian appointed him prefect of Constantinople in 362, and corresponded with him; and although he was a heathen, he was intrusted by Theodosius the Great with the education of his son Arcadius. He was the teacher of Libanius and Augustin, and kept up a friendly intercourse with Gregory Nazianzen, who calls him in his letters 'the king of arguments.'

Of thirty-six orations composed by him which were known to Photius, thirty-three have come down to us in the original Greek, and one in a Latin translation. They have reference for the most part to public affairs, and several of them are panegyrics upon the emperors by whom the orator was patronised. The most complete edition is that of Harduin (Paris, 1684, fol.), which contains thirty-three orations, thirteen of which had not been printed before. Another oration was discovered by Angelo Mai, and published by him at Milan, 1816, 8vo. W. Dindorf also published, in 1830, two orations of Themistius, corrected from a Milan MS. Themistius was also the author of paraphrases on some of Aristotle's works.

THEMI'STOCLES was born about B.C. 514. He was the son of Nícocles, an Athenian of moderate fortune, who however was connected with the priestly house of the Lycomédæ; his mother was not an Athenian citizen, but either a native of Caria or of Thrace. The education which he received was like that of all Athenians of rank at the time, but Themistocles had no taste for the elegant arts: he applied himself with more zeal to practical knowledge. His mind was early bent upon great things. The powers with which nature had endowed him were quickness of perception, a sound judgment, and great readiness and sagacity. In B.C. 483, when Aristides was sent into exile, to which Themistocles is said to have contributed, he had almost unbounded possession of the popular favour; and in B.C. 482 he was elected archon epónymus. Athens was then at war with Ægina, and Themistocles, who foresaw that there would be another contest with Persia, persuaded his fellow citizens to strengthen their navy by applying to this purpose the produce of the silver mines of Laurion, which had up to this time been distributed among the people of Athens. The fleet was raised to the number of 200 ships. (Herod., vii. 144.) It was probably at this time also that he persuaded the Athenians to build twenty new ships every year. Xerxes was now at Sardis, in the spring of 480 B.C., ready to lead his immense armament against Greece. Peace was made with Ægina, the disputes among the Greeks were somewhat allayed by the exertions of Themistocles, and a detachment of the allied troops was sent to hold the pass of Tempe, under the command of Themistocles and a Spartan. But finding that they could make no resistance there, the troops returned to the isthmus of Corinth. When Xerxes arrived in Pieria, the Greek fleet took its station off Artemisium, on the north coast of Eubœa, under the command of the Spartan admiral Eurybiades, under whom Themistocles served, although Athens furnished 127 ships, and supplied the Chalcidians with twenty others; while the Spartan contingent was incomparably smaller. The Persian fleet sustained severe losses by a storm on the coast of Thessaly, but its approach so alarmed the Greeks, that Themistocles had great difficulty in inducing them to maintain their station. In the battle which took place, the Greeks gained considerable advantage, though the victory was not decided. A storm, and a second engagement near Artemisium, severely injured the fleet of the Persians, but the Greeks also sustained great losses. At the same time they heard of the defeat of Leónidas at Thermópylæ, upon which the fleet retired to the Saronic Gulf. Xerxes was advancing upon Athens by land, and his fleet was approaching the shores of Attica. Themistocles, turning to his purpose an ambiguous response of the Delphic oracle, persuaded the Athenians to trust to their wooden walls, which he said were their ships, and to send the old, the infirm, and the women and children to Salamis, and other places. The combined fleet of the Greeks, to the number of 380 ships, assembled at Salamis under the command of Eurybiades. In the meantime the Persians entered Attica and burnt Athens. The Greeks were alarmed, and it required all the influence of Themistocles, and threats too, to induce Eurybiades to stay. The Persian fleet was now in the Saronic Gulf, and Themistocles secretly informed the Persian commander, that if he wished to destroy the Grecian fleet, he must attack it before it had time to disperse.

This apparently well-meant advice was eagerly taken up by the enemy, who now hastened, as he

thought, to destroy the fleet of the Greeks. But the event proved the wisdom of Themistocles. The unwieldy armament of the Persians was unable to perform any movements in the narrow straits between the island of Salamis and the mainland. The Greeks gained a complete victory, for they only lost forty ships, while the enemy lost two hundred. Xerxes with the remains of his fleet left the Attic coast and sailed towards the Hellespont. The battles of Artemisium and Salamis were fought 480 B.C. [SALAMIS.]

Themistocles proposed to pursue the fleet to the Hellespont, but he yielded to the opposition, and employed the fleet in levying contributions on the islands of the Cyclades, and, it is said, enriching himself. His dexterity and courage had saved Greece, but the confederate Greeks, through jealousy, awarded him only the second prize.

In B.C. 479 the Persians were again defeated at Platææ and at Mýcale. The Athenians began to rebuild their city, and Themistocles advised them to extend and strengthen their fortifications. The Spartans, with a selfish policy, attempted to induce the Athenians not to restore their walls; but Themistocles, who at his own suggestion was sent to Sparta to treat about the matter, deferred the negociations, and amused the Spartans until the walls were raised high enough to render any further artifice unnecessary. On his return he also persuaded the Athenians to fortify the three ports of Phalérum, Munychia, and Piræus, and to connect the Piræus by walls with Athens.

Notwithstanding the great services of Themistocles, he felt the effects of popular envy. He is said to have enriched himself by dishonourable means, and his wealth made him enemies. The jealousy and hatred of the Spartans also probably contributed to his downfall. At last in 472 B.C. he was banished from Athens by the ostracism. He took up his residence at Argos, where he was still residing when, in the same year, B.C. 472, Pausanias was put to death at Sparta for his ambitious and treacherous designs, and his fate involved that of Themistocles. The Spartans, in their search to discover more traces of the plot of Pausanias, found a letter of Themistocles, from which it was evident that he had been acquainted with his plans. Ambassadors were forthwith sent to Athens to demand that he should suffer the same punishment as Pausanias; and the Athenians sent persons to arrest him. Themistocles made his escape to Corcýra, and thence to the opposite coast of Epirus. At last he got to Pydna in Macedonia, whence he sailed in a merchant ship to Ephesus. A few months after his arrival in Asia Xerxes was assassinated (B.C. 465) and succeeded by his son Artaxerxes. Themistocles, it is said, sent a letter to the new king, in which he represented himself as persecuted in consequence of his zeal for the interests of Persia. He asked and obtained a year for the study of the Persian language and customs, and then presented himself to the king, who was much pleased with him. After spending some years with the king he returned to Asia Minor, when a liberal provision was made for him after the Persian fashion. Three towns were given him, and he enjoyed a princely revenue. He had given the king hopes of conquering Greece with his assistance; but death overtook him at the age of sixty-five, before any of his plans were carried into effect. Most of the ancient writers state that he put an end to his life by poison. The motive for his suicide is very doubtful. Before he took the poison he is said to have requested his friends to convey his remains secretly to Attica, and in later times a tomb which was believed to contain them existed in Piræus. In the market-place of Magnesia a splendid monument was erected to his memory, and his descendants in that place continued to be distinguished by certain privileges down to the time of Plutarch.

THENARDITE, is a whitish, translucent, soluble mineral, which crystallises in right rhombic prisms: it consists of nearly pure sulphate of soda.

THEOBALD, LEWIS, was born at Sittingbourne in Kent. We have no record of the date of his birth. His father was an attorney, and he was bred to his father's business. His first literary production was 'Electra,' a tragedy, which appeared in 1714. As the writer of twenty very indifferent plays he is utterly forgotten. He is most commonly known as the unhappy dunce whom Pope assailed with the most inveterate ridicule. His 'bad eminence' as the original hero of the 'Dunciad' was earned by a pamphlet entitled 'Shakespear Restored, or Specimens of Blunders committed and unamended in Pope's Edition of this Poet,' published in 1726. In 1733 he produced an edition of Shakspere which entirely superseded that of Pope; but it is to be feared that it was rather a new hatred than a sense of justice, however tardy, which induced Pope in 1743 to dethrone Theobald from the heroship of the 'Dunciad,' and to set up Colley Cibber in his place. Theobald died Sept., 1744.

The great merit of Theobald as an editor of Shakspere is that he industriously collated the early editions, and that he did not attempt to do too much, and therefore was commonly right. The most happy emendations of Shakspere, almost the only admissible ones, have been produced by the caution of Theobald. He was also the author of a Life of Sir Walter Raleigh; and he wrote the greater part of the periodical papers entitled 'The Censor,' which appeared as a separate work in 1717, having been previously published in Mist's 'Weekly Journal.'

THEOBRO'MA, the name of a genus of plants belonging to the natural order *Sterculiaceæ*, the species of which yield the Cocoa of commerce.

T. Cacao, Common Cacao or Chocolate-Nut Tree, is indigenous in South America, and is generally found at a height of 600 feet above the level of the sea. It is however extensively cultivated in the West Indies, and in the tropical parts of Asia and Africa. The Mexicans call the tree *chocolalt*, and hence our word chocolate for the prepared seeds. The capsules of the fruit are large, and contain each about 25 seeds; the pulp in which these are enveloped has a sweet and not unpleasant taste, and is frequently eaten where the tree is grown. The trees are evergreens, and

bear fruit and flowers all the year through, but the usual times for gathering the fruit are in June and December. The cotyledons of the seeds contain a large quantity of oily albumen, which has an agreeable flavour, and on this account they are not only used as a principal article of diet by the natives of the countries in which they grow, but are now used for the same purpose throughout the civilised world.

The kernels of the Theobroma are used as an article of nutriment either in the natural state as they are received from America or prepared in various ways. The simplest and best form is that of the seeds roughly crushed, termed Cocoa Nibs, which however require two hours boiling, as, owing to the peculiar nature of the endosperm, or inner seed-coat, which passes down into the substance of the cotyledons, the prolonged application of heat and moisture is necessary to dissolve the contents. Flake Cocoa is merely the seeds crushed between rollers. When Chocolate is to be made, the beans, after being carefully picked so as to free them from mouldy or worm-eaten ones, are to be gently roasted over a fire in an iron cylinder, with holes in the ends to allow the vapour to escape. When the aroma begins to be well developed, the process is considered complete. The beans are then turned out, cooled, and freed by fanning and sifting from their husks. They are then converted into a paste by beating in a mortar, put into moulds, and sent to market. When the kernels alone are used, or only a little sugar added, the chocolate is termed 'Chocolat de Santé.' But vanilla, cloves, cinnamon, and other aromatics, are frequently added; as are also rice, almonds, starch, &c. Simple chocolate is mostly preferred in Britain; the perfumed sorts in France, Italy, and Spain, in which countries the consumption is immense. For invalids the plain chocolate is best, the perfumed being too heating. Where tea and coffee disagree, cocoa or chocolate is the best substitute. It is sometimes complained that it is heavy and disturbs the stomach, and not unfrequently causes headaches. In almost all instances this arises from making the beverage too strong. The printed directions order far too much of the substance to be employed. Half the quantity is sufficient.

The oil contained in the seeds is sometimes obtained separately, and called Cocoa Butter. It may be obtained easily by expression, especially if hot water is added. It is said to be very nutritive, and to act as an anodyne. It is particularly recommended for making ointments.

THEOCRACY (*Θεοκρατία, a government by God*) is a term applied to the constitution of the Israelitish government, as established by Moses, on account of its being under the direct control of God.

THEO'CRITUS was a native of Syracuse, where he also spent the greater part of his life. He lived in the reign of Ptolemæus, the son of Lagus, and Ptolemæus Philadelphus, and the time of his greatest reputation was about the year B.C. 277. Some years before this time, probably about B.C. 284, he had visited Alexandria. There is extant by Theocritus a collection of various poems, which are written in what the Greek grammarians call the new Doric dialect. The particular species of poetry by which he has acquired most celebrity are the Bucolics (*μέλη βουκολικά*). This pastoral poetry was very popular in Sicily, and having been originally cultivated by shepherds and rustics, was raised to a really artistic rank by several poets before Theocritus. He however brought this kind of poetry to perfection, and the ancient critics regard him as the model of bucolic poetry. But the number of real bucolic poems still extant in the collection which bears the vague name of Idyls (*εἰδύλλια*), is only ten.

All the genuine poems of Theocritus show him to have been a perfect master of his art. His power over the language is not less wonderful than his taste for the simple beauties of nature, and the skill with which he handled his subjects. His poems are indeed founded upon the national shepherd songs of Sicily in the form of dialogues, but he has added features of his own, and idealised his persons without depriving them of their natural simplicity. The last edition, which is very useful to students, is by E. F. Wüstemann, Gotha and Erfurdt, 1830, in 1 vol. 8vo. Theocritus has been translated into most of the languages of modern Europe. There is an English translation by Fawkes, 8vo., 1767, and a translation, including Bion and Moschus, by Polwhele, 4to., 1786, and in 2 vols. 12mo., 1811. The best French translation is that of J. B. Gail, with explanatory and critical notes, Paris, 1808, 3 vols. 4to. The best German translations are those of J. H. Voss (Tübingen, 1808, 8vo.) and Witter (Hildburghausen, 1819, 8vo.).

THEODOLITE is the name generally given to the instrument used for measuring horizontal angles. In its simplest form the theodolite consists of a divided circle, which is to be set parallel with the horizon, and a telescope which has so much motion in a vertical plane as to enable the observer to view any object which he may require above or below the horizon.

THEODORE'TUS, or THEODORI'TUS, was born about 393 A.D. He was brought up under the care of a pious mother; and he had instruction from Theodore of Mopsuestia and John Chrysostom in a monastery, to which he was sent when not quite seven years old. Theodoret became a deacon in the church at Antioch, and in 423 was chosen bishop of Cyrus, a city in Syria. Against the opinions of the heretics, with whom his diocese abounded, he directed his efforts with so much success that, according to his own statement, he baptized 10,000 Marcionites.

In 431, when Nestorius was condemned by the council of Ephesus [NESTORIANS], Theodoret was one of those who assembled and condemned its proceedings. He warmly protested when John, patriarch of Antioch, gave his consent to the condemnation of Nestorius; and although he submitted for a time he afterwards renewed his opposition, and incurred the lasting hatred of Cyril, which ended only with his life in 444.

Cyril was succeeded by Dioscúrus, a man as haughty and impetuous as himself, and quite as

unscrupulous. The new bishop followed up his predecessor's plan of enforcing upon the whole Eastern church the doctrine of the coalescence of the Deity and humanity into one nature in the person of Christ. Theodoret was as usual slow to take up the controversy. He wrote to Dioscúrus in the hope of effecting a compromise. In this attempt he failed; and then, looking upon the doctrine of Dioscúrus and his allies as the sure road to the various heresies which denied the true humanity of Christ, he wrote a book against them in 447, entitled 'The Beggar, or the Many-shaped,' which displayed great learning and power, together with a moderation which drew upon Theodoret the reproaches of the zealots of his own party. His opponents however saw in his doctrines nothing less than a revival of Nestorianism; and Dioscúrus, after some correspondence with Theodoret, sent ambassadors to Constantinople to accuse the whole Eastern church of Nestorianism before the Emperor. The result was that the Emperor ordered Theodoret, as a troubler of the church, to confine himself within the limits of his own diocese. Theodoret bitterly complained of being thus condemned unheard.

In the meantime the two parties grew more violent, and the imperial court itself became the scene of their disputes. In 449 the second council of Ephesus, acting on a hint from the Emperor, deposed Theodoret from his bishopric, and he was compelled, by an imperial edict, to retire into the monastery where he had been educated. In 451 however an œcumenical council was assembled, first at Nicæa, but very soon removed to Chalcédon, to which Theodoret was summoned. He petitioned the council for restoration to his bishopric: at the eighth sitting his petition came on for hearing: he rose to plead his cause; but the party of Dioscúrus exclaimed that he must first condemn Nestorius. This condemnation after some hesitation he pronounced, and being declared to have established his orthodoxy, the unanimous vote of the council restored him to his bishopric.

In this transaction we perceive that Theodoret's firmness had at length given way before the furious zeal of the Eutychians; and his courage appears never to have revived, for in his latest work, which was the 'History of Heresies,' he speaks of his former friend Nestorius in the harshest terms.

After the council of Chalcedon, Theodoret returned to his diocese, where he devoted the rest of his life to literary labours. He died in 457.

His works, besides those already mentioned, were:—'A History of the Church,' in five books, from 325 to the death of Theodore of Mopsuestia in 429; 'Φιλόθεος ἱστορία,' an account of the lives of thirty celebrated hermits; 'Ten Orations against the Heathen;' an 'Apology for Christianity;' besides 146 letters and commentaries on most of the books of the Old Testament and on all the epistles of St. Paul; and some others.

The best edition of his works is that of Schulze, in 5 vols. 8vo., Halle, 1768–74.

THEODORIC, or THEODERIC I., king of the Visi-Goths, was the elected successor, but was not the son, of King Wallia, who died A.D. 419. During the latter years of the reign of the Emperor Theodosius II., Theodoric invaded Gaul, and in 425, just after the accession of Valentinian III., he laid siege to the city of Arles. Aëtius however relieved this town, and made peace with the Goths, who marched against the Vandals together with the Romans. After a peace of ten years, a new war arose between the Romans and Theodoric, who in 436 besieged the city of Narbonne, which was only relieved in the following year, 437. The issue of this war proved unfortunate for the Romans, the inhabitants of their provinces in Gaul being reduced to despair by heavy taxes and other kinds of oppression. Aëtius enlisted several thousand Huns, in order to employ them against the Goths; but these auxiliaries were more destructive to the inhabitants than their enemies. A body of the Romans, together with these Huns, commanded by Litorius, the best of the generals of Aëtius, having made some progress, laid siege to Toulouse in 439. Theodoric proposed to conclude a peace, but Litorius refused all terms. Upon this the Goths made a sally; the Romans were entirely beaten, and Litorius himself was made a prisoner.

The whole country as far as the Rhône was now open to the Goths, and Theodoric made fresh conquests. The remainder of the Roman army was disorganised, and in the greatest consternation. Nevertheless Avitus, who was then Præfectus Prætorio in Gaul, found means to make peace, which was certainly favourable to the Goths, though the conditions are not known. In 450 Gaul was invaded by Attila with his Huns and a numerous body of Teutonic auxiliaries. Attila pretended that his object was only to attack the Visi-Goths, but the Romans also took arms, and the united forces of Aëtius and Theodoric met the Huns at Châlons-sur-Marne (451). The battle was disastrous for Attila, who fled on the following day. King Theodoric was killed at the beginning of the battle. Prince Thorismund was proclaimed king in the camp of his father, whom he caused to be interred on the field of battle with great pomp.

THEODORIC, or more correctly THEODERIK, surnamed 'the Great,' king of the Ostro-Goths, was the son of King Theodemir by his concubine Eralieva (Ehrlieb). He was born in 455, and he was seven years old when he was sent to Constantinople to the court of the Emperor Leo Magnus (457–474) as a hostage. Theodoric received his education at Constantinople, and returned to his father in 472. Theodemir died in 475, and Theodoric became king of the Ostro-Goths.

The Emperor Zeno having been deposed by another Theodoric, King Theodoric marched to his assistance, and by his aid Zeno was again acknowledged as emperor (476–477). Zeno created him Patricius and Magister Militiæ Præsentis in 483, and subsequently promoted him to the consulship in 484.

Notwithstanding the honours which Zeno conferred upon the king of the Goths, Zeno showed his insincerity wherever he saw an opportunity. To avenge himself, Theodoric invaded Thrace (in 488), dispersed the imperial troops, and

besieged Zeno in Constantinople. The emperor and the king came to terms, but the particulars of their agreement are obscurely known. The Goths affirmed that Zeno ceded Italy to their king.

Theodoric assembled his people (489). A whole nation, men, women, and children, carrying all their moveable property with them, left their homes and took the road to Italy. Enduring hardships of all kinds, and fighting their way through the armed inhabitants, the Goths crossed the Julian Alps, and reached Isonzo, where they met with the army of Odoacer, who was beaten in three battles (490). Odoacer was blocked up in Ravenna by one part of the Goths, and Theodoric, with another part, took possession of the whole peninsula of Italy, leaving Sicily, Sardinia, and Corsica to the Vandals. The siege of Ravenna lasted three years; but at last Odoacer surrendered to Theodoric, who, notwithstanding his oath to spare the life of his prisoner, ordered him to be put to death in his own palace (493).

Theodoric was now acknowledged as king of Italy by the Emperor Anastasius, the successor of Zeno. In 500 he went to Rome and celebrated a triumph. Theodoric gave his daughter Ostrogotha in marriage to Sigismund, the son of Gundobald, a Burgundian king. He likewise kept peace with the Vandals, and gave his sister Amalfrida in marriage to their king Thrasimund. His eldest daughter, Theodichusa, was married to Alaric II., king of the Visi-Goths; and his niece, Amalaberga, became the wife of Hermanfrid, the last king of the Thuringians. Theodoric himself took for his second wife Andofleda, the sister of Clovis, king of the Franks.

Meanwhile a war had broken out between Clovis and Alaric II., king of the Visi-Goths. Alaric fell in the battle of Vouglé in 507, in consequence of which the greater part of the dominions of the Visi-Goths in Gaul came into the hands of the Franks. Alaric's only legitimate son was a child named Amalaric, whom he had by his wife Theodichusa. As there was danger of all Spain being invaded by the Franks, the Visi-Goths intrusted the guardianship of their young king to Theodoric, who thus became the ruler over the Ostro-Goths and the Visi-Goths, or over Spain, southern Gaul, Italy with the dependent province of Illyricum, and parts of Rhætia, Noricum, and Pannonia. Theodoric had previously sent an army into Gaul, commanded by Iba, who delivered Arles, which was besieged by the Franks (508); and the same general made a prisoner of Gesalic, the natural son of Alaric II., who was a dangerous rival of young Amalaric. Clovis was compelled to content himself with the northern and larger part of the Visi-Gothic dominions in Gaul. From this year, 511, is dated the regency of Theodoric in the kingdom of the Visi-Goths, who however styled himself king.

The relation between Theodoric and the emperors of Constantinople was maintained to the satisfaction of both parties, until Justin published a severe edict against all who were not of the Catholic church (523), and soon after deprived the Arians of their churches. Theodoric, who was an Arian, like all the Goths, ordered Pope John with several bishops to go to Constantinople, and to obtain better conditions for the Arians in the Eastern Empire. The Pope reluctantly obeyed, but it seems that in Constantinople he spoke rather according to his conscience than in favour of the Arians; for he was imprisoned at his return, by order of Theodoric, and died not many days after, on the 18th of May, 526. On Theodoric's recommendation, Felix was elected pope, and his election was confirmed by Athalaric, the successor of Theodoric. Theodoric died suddenly on the 26th of August, 526, in the 72nd year of his age. He left no male issue, and Athalaric, the son of his daughter Amalaswinth, succeeded him on the throne of Italy, and Amalaric became king of the Visi-Goths.

Theodoric was not only a conqueror; he was also a legislator. He was a friend of peace, of toleration, and of justice; a glory however which is somewhat obscured by some acts of rashness and violence.

THEODORUS I. II. [Pope.]

THEODO'RUS LA'SCARIS, emperor of Nicæa, was descended from a noble Byzantine family. In 1198 he married the second daughter of the Emperor Alexis III., Angelus-Comnenus, who usurped the throne of Constantinople, after having blinded and thrown into a prison the Emperor Isaac Angelus (1195). Alexis, the son of Isaac, fled to Italy, and implored the protection of the Western princes, who, in 1203, were assembled at Venice for the purpose of a new crusade. The consequences were the siege and surrender of Constantinople, and the flight to Italy of Alexis III. Alexis IV. was murdered, and Constantinople having been again besieged, Alexis V. fled with his treasures (1204). Two candidates presented themselves to the people for the purpose of obtaining the crown: these were Theodorus Lascaris and Theodorus Ducas, who was of imperial descent. Lascaris was the successful candidate; but he was shortly afterwards obliged to fly into Asia, the Latins having taken the city by storm.

Theodorus succeeded in raising troops in Asia, and assisted by the Turks of Koniah, or Iconium, he made himself master of the important town of Nicæa and the greater part of Bithynia. He sustained some reverses, and would have been ruined but for the victories of the king of the Bulgarians and the revolted Greeks over the troops of Baldwin, the new emperor of Constantinople; but having again become master of this country, and his father-in-law, Alexis III., being then kept a prisoner by the Marquis of Monteferrato, he assumed the title of Emperor. In order to solemnise his accession Alexis convoked a general assembly of the Greek bishops, who met at Nicæa.

Meanwhile several Greek nobles had made themselves independent in Asia. These were disposed of without much difficulty; but a third and more dangerous adversary was Alexis Comnenus, who had reigned as emperor at Trebizond from the year 1204, and whose brother David overran Asia Minor as far as the Propontis and the Ionian Sea. David concluded an alliance with Henry of

Flanders, emperor of Constantinople, who had succeeded his brother Baldwin; but Theodorus defeated them both. David lost all his conquests, and Theodorus (1214) became master of the greater part of Paphlagonia.

Meantime, in 1210, the old Emperor Alexis III., who had escaped from the Marquis of Monteferrato, fled to Asia, to the court of Sultan Ghaïyáth-ed-dín, and persuaded him to support his claims to the throne of Nicæa, or of any other part of the Eastern Empire. The army of the Sultan however, consisting of 20,000 men, was entirely defeated in the neighbourhood of Antioch by Theodorus. Ghaïyáth-ed-dín himself was killed, and old Alexis was made a prisoner. He was confined to a monastery at Nicæa, where he died some years afterwards.

Except one short campaign against Henry in 1213, which was followed by a truce in 1214, Theodorus reigned the last ten years of his life in peace. He died in 1222, being between 45 and 50 years old. Although he left a son, his successor was his brother-in-law John Vatatzes.

THEODOSIAN CODE. [CONSTITUTIONS, ROMAN.]

THEODO'SIUS of Bithynia or of Tripolis in Lydia, for it appears that both these descriptions are applied to him, was a mathematician, of whom there is some question whether he lived about 50 years before Christ, or some centuries after. His profound and accurate work on what we should now call Spherical Geometry remains; together with two astronomical writings of less note.

THEODO'SIUS I., FLA'VIUS, surnamed the Great, was the son of the general Theodosius who signalised himself in the reign of Valens and Valentinian in Britain and Africa. The Theodosii were an illustrious family of Spain, of the town of Itálica, near the modern Seville. Theodosius was born in A.D. 345, and was educated by the ablest men of the time: his father instructed his son in the art of war, and accustomed him to the strictest discipline. He took him with him in his campaigns in Britain, Germany, and Africa. After the death of his father, in A.D. 376, he retired to Cauca in Spain, where he devoted himself to agricultural occupations on his extensive estates.

On the 16th of January, 379, the Emperor Gratian raised Theodosius to the dignity of Augustus, with the command over Illyricum and the eastern provinces of the empire. Theodosius established his head-quarters at Thessaloníca in Macedonia, strengthened the garrisons in those parts of the empire, and restored discipline among the troops. The Visi-Goths, who were threatening the East, were gradually driven out of Thrace. While at Thessalonica, Theodosius was seized with a severe illness. He was of a Christian family, but had not yet been baptized, and he now celebrated this solemnity by the advice of his friends. On his recovery he went to Constantinople, and the first acts of his administration were to expel all the Arians from the capital, and to appoint Gregorius Nazianzenus archbishop of Constantinople (A.D. 380). His persecution of the Arian sect was conducted with such zeal that orthodoxy was soon restored throughout his dominions. He then held a council at Constantinople to complete the system, the foundation of which had been laid at the council of Nicæa, and a number of edicts were successively issued, inflicting the severest punishments upon heretics. After the death of Fritigern, the Goths made Athanaric their king, who concluded a treaty with Theodosius at Constantinople (A.D. 381). Athanaric did not long survive this peace, but his subjects, who were pleased with the treatment of Theodosius, submitted to him, and numbers of them enlisted under the Roman standard. This was followed by successive separate treaties of the Visi-Gothic chiefs, who promised to become the faithful allies of the Romans; and lands were assigned to the Visi-Goths in Thrace and Lower Mœsia (A.D. 382). The Ostro-Goths on the banks of the Danube were conquered several years later (A.D. 386), and received settlements in Phrygia and Lydia.

In 383 Theodosius raised his son Arcadius to the rank of Augustus: and in the same year his benefactor Gratian was murdered in a rebellion. Maximus, supported by the troops in Britain, had set himself up as emperor, and had conquered Gaul. Theodosius for the present concluded a peace with him, and left him in possession of the countries which he was occupying north of the Alps, on condition that he should not disturb Valentinian, the brother of Gratian, in Italy, Africa, and western Illyricum. The empire was thus divided among three emperors. But in A.D. 387 Maximus broke in upon Italy, and took Milan, the residence of Valentinian. The young emperor, his mother Justina, and his sister Galla, fled to Thessalonica, to implore the protection of Theodosius. The Emperor of the East received the fugitives kindly, and as his own wife Flacilla had died, he married Valentinian's sister Galla. A large fleet was assembled in the ports of Epirus and Greece, and Theodosius, at the head of a well-disciplined army, marched into Pannonia to meet the enemy. A battle was fought, in which Maximus was defeated. He fled to Aquileia, where he was put to death, with the consent of Theodosius. Theodosius stayed for three years in Italy to regulate the state of the western provinces. In the year 389 he entered Rome in triumph, with his son Honorius and Valentinian.

During the period of his stay in Italy an insurrection broke out at Antioch, which originated in the grievances of the people. The insurrection was put down, but the Emperor resolved to punish the citizens. He pardoned them however upon their expression of sincere sorrow. This generous act was followed by one which was as rash as it was cruel. In A.D. 390 another insurrection broke out at Thessalonica. Theodosius in his passion sent orders to punish the inhabitants, though he soon regretted his step, and countermanded his orders. But it was too late: a general massacre took place in the devoted city, in which no less than 7000 lives were sacrificed. When Ambrose, the archbishop of Milan, was informed of this cruel massacre, he was seized with indignation and grief; and eight months later, when

the Emperor, on Christmas-day, wished to attend the service in the great church of Milan, he was stopped in the porch by Ambrose, and was not admitted until he had promised to do public penance for his cruelty. It was not till after the lapse of eight months, that the Emperor, who had performed all the acts of public penance which the Archbishop had imposed upon him, was restored to the communion of the faithful. When Theodosius left Italy for Constantinople in A.D. 391, he left Valentinian in possession of the western part of the empire. The most important occurrence in the year of his arrival at Constantinople was the abolition of paganism throughout the Roman Empire. In the following year (392) Valentinian was murdered at Vienne, in Gaul, by Arbogastes, who raised Eugenius, a rhetorician, to the imperial throne. Theodosius, though indignant at this treachery, was not prepared for war, and the ambassadors whom Eugenius sent were received with apparent favour. But in the spring of 394 Theodosius set out from Constantinople against Eugenius, who was defeated near Aquileia. Eugenius was put to death, and Arbogastes in despair committed suicide. Theodosius died on the 17th of January, 395, at Milan, whence his body was conveyed to Constantinople. His sons Arcadius and Honorius had been raised to the rank of Augustus, and the father had shortly before his death given to Honorius the empire of the West, while Arcadius was to occupy the throne of the East.

THEODOSIUS II., the Younger, the son of Arcadius, was born on the 10th of April, 401. His father died in 408 at Constantinople, and left his son at the head of the Eastern Empire. Anthemius, the præfectus prætorio, had the government of the Eastern Empire in the name of the young prince until 414, when he resigned it to Pulcheria, the sister of Theodosius. This woman exercised the sovereignty in the name of her brother to the time of his death. Theodosius passed his whole life in a perpetual infancy, surrounded by women and eunuchs, and he idled away his time in hunting, painting, carving, and making elegant transcripts of sacred books. Pulcheria persuaded him, A.D. 421, to marry Eudocia, a woman no less distinguished for her beauty than for intellectual powers. She lived with her husband till the year 444, when, after having drawn upon herself suspicion of some improper conduct, she withdrew to Jerusalem. Theodosius died A.D. 450. In the reign of Theodosius was made the collection of imperial constitutions which formed the Theodosian Code. [CONSTITUTIONS, ROMAN.]

THEOGNIS, an elegiac poet of Mégara, was living at the close of the sixth century B.C.; and it appears from his own writings that he lived to the date of the battle of Salamis, B.C. 480. In one of those revolutions which frequently occurred in the small Grecian states, the democratic body at Megara overpowered the aristocratic, to which Theognis belonged. Theognis lost his landed property in this revolution, which, with the rest of the Megarian territory, was partitioned among the successful party. It appears that he lived in exile at Thebes. The fragments of Theognis abound in allusions to the revolution by which he had suffered, and he expresses in bitter language his complaints against that base class which had usurped the station and property of the body to which he belonged. His elegies, in the form in which we now have them, are a general collection of maxims or lessons of conduct in about 1400 hexameter and pentameter verses. One of the latest and best editions of Theognis is by F. T. Welcker, 1826.

THEOLOGY (*θεολογία*, the science which relates to God).

All that men know of the nature of God, considered absolutely, of the relations between God on the one hand, and themselves and other beings on the other, together with the consequences resulting from those relations, and the duties arising out of those relations:—all this knowledge is described by the word *religion*. To reduce this knowledge to a systematic form, is the province of the science of *theology;* and the truths of religion, when arranged in a scientific form, constitute *a system of theology*. Theology stands to religion in the same relation as that in which every other science stands to its subject: for instance, natural philosophy to matter, metaphysics to the mind, philology to language. By many writers the words *theology* and *religion* are used as synonymous terms; but such a usage is incorrect.

THEON, ÆLIUS, a rhetorician and grammarian of Alexandria, who lived about A.D. 315. With the exception of his 'Progymnásmata,' or practical rules on rhetoric, derived from the examples of the best Greek orators, there is no work extant that can be ascribed to him with certainty. Theon's 'Progymnásmata' excel those of Aphthonius in elegance, precision, and clearness, and were, like those of Aphthonius, long used as a text book in schools. The best edition of the text, accompanied by Greek scholia, is in Walz's 'Rhetores Græci.'

THEON. Theon, the Elder, of Smyrna, was the contemporary of Ptolemæus (who cites one of his observations), but a little older. Theon, the Younger, of Alexandria, the commentator on Ptolemæus, and father of Hypatia, lived in the latter half of the fourth century.

Of Theon the Elder, or Theon of Smyrna, we know nothing but that he was a follower of Plato, and has left a work on the parts of mathematics which are useful towards a knowledge of Plato.

Of the private life of Theon the Younger (who was also a Platonist) we know nothing, except that he professed the ancient heathen doctrines, which led to the memorable murder of his daughter Hypatia (A.D. 415), by the populace of Alexandria. She had arrived (says the historian Socrates) to so eminent a degree of learning that she excelled all the philosophers of her own times, and succeeded in that Platonic school derived from Plotinus, and expounded all the precepts of philosophy to those who would hear her. Wherefore, all persons who were studious about philosophy flocked to her from all parts. Suidas says she wrote commentaries on Diophantus, and on the Conics of Apollonius, and also an astronomical canon.

Theon of Alexandria is known as the commen-

tator of Ptolemæus and editor of Euclid. There is a commentary on Aratus which is said to have been his, but Grotius is of opinion that it is the work of several hands, for which he gives good reasons. The whole of the commentary on the Syntaxis is preserved, except one or two books.

It only remains to speak of Theon as a commentator on Euclid, a character which some still persist in giving him. The fact is, that Theon, as he himself informs us in the commentary on Ptolemæus, gave an edition of Euclid, with here and there an additional proposition. Some manuscripts of Euclid call this a commentary, and our fathers of the middle ages got the notion that all the demonstrations were commentaries supplied by Theon, only the enunciations of the propositions being Euclid's.

Robert Simson, and other editors, who alter according to their own ideas of perfection, and then swear that they have restored Euclid, always lay the blame of the supposed alterations upon Theon: Simson's phrase is 'Theon, or some unskilful commentator.' There is no reason to suppose that Theon altered Euclid: all that is known is, that he added occasionally, and, if we look at those additions which it is certain he made, he added judiciously.

THEO'PHILUS, of Constantinople, lived in the time of Justinian (A.D. 527–565). He was a teacher of law at Constantinople, and at the command of the Emperor he was employed among those who compiled the 'Digest,' and he afterwards, with Dorótheus and Tribonian, compiled the 'Institutiones,' or the elementary treatise on jurisprudence, which was part of Justinian's plan. This Theophilus is generally supposed to be the author of the Greek paraphrase of the 'Institutes.' The last and best edition is that of W. O. Reitz, in 2 vols. 4to., Hagæ, 1751. The value of the paraphrase of Theophilus in establishing the text of the 'Institutes' may be estimated by an examination of the edition of the 'Institutes' of Gaius and Justinian by Klenze and Böcking, Berlin, 1829.

THEOPHRASTA, the name of a genus of plants dedicated to Theophrastus. It was originally called *Eresia* by Plumier, but afterwards altered by Linnæus. It belongs to the natural order *Myrsinaceæ*. There is but one species, named after Jussieu, *T. Jussieui*. This plant is the same as the *T. Americana* of Linnæus. It is a native of the mountains of St. Domingo, and is much cultivated on account of its long handsome holly-like leaves.

THEOPHRASTUS was born at Éresus, in the island of Lesbos, but the year of his birth is uncertain. When he was a youth his father sent him to Athens for the purpose of studying. Here he was first a pupil of Plato, and became an intimate friend of Aristotle, who, charmed with his talents and his beautiful pronunciation, is said to have given him the name of Theophrastus (one who speaks divinely): his real name was Týrtamus. After the death of Plato, when Speusippus had placed himself at the head of the Academy, Theophrastus left it. After the battle of Chæronea, Theophrastus returned to Athens, from which he had been absent for many years; and as Aristotle had then just opened his school (the Lyceum), Theophrastus ranged himself among the hearers of his friend. When Aristotle withdrew, Theophrastus became his successor in the Lyceum, and acquired great reputation. The number of his pupils on one occasion is said to have amounted to two thousand, from all parts of Greece.

Theophrastus died at Athens, B.C. 285, and the whole population is said to have followed his body to the grave. His will, in which he disposed of his literary and other property, is preserved in Diógenes Laertius. His library contained the works of Aristotle, which this philosopher had bequeathed to Theophrastus. Theophrastus bequeathed them, together with his other literary property, to Neleus of Scepsis.

His philosophical works may be divided into works on philosophy, in the narrower sense of the word, works on historical subjects, and works on certain arts, such as oratory, poetry, and the like. It is to be lamented that most of his writings on these departments are now lost, and more especially those on politics (Πολιτικὰ), on legislators (περὶ νομοθετῶν), on laws, a work of which Cicero made great use, and his works on oratory, of which Theophrastus himself was so distinguished a master. The following philosophical works of Theophrastus are still extant:—

1. 'Charactéres,' or ἠθικοὶ χαρακτῆρες, consisting of thirty, or, according to Schneider's arrangement, of thirty-one chapters. In this work the author gives thirty characteristic descriptions of vices, or rather, of the manner in which they show themselves in man. The descriptions however are mere sketches, and form a gallery of bad or ridiculous characters. There is a good edition of the 'Characters,' by Fr. Ast, 1816. There is a French translation by La Bruyère; and there are also several English versions, the last of which is by F. Howell, London, 1824.

2. A fragment of a work on Metaphysics, which consists of one book entire. The last edition is that of Ch. A. Brandis, who annexed it to his edition of Aristotle's 'Metaphysics' (Berlin, 1823, 8vo.).

3. A Dissertation περὶ αἰσθήσεως, that is, on the Senses and the Imagination.

The 'History of Plants,' by Theophrastus, περὶ φυτῶν ἱστορίας, is one of the earliest works on botany that was written with anything like scientific precision. The work is divided into ten books, of the last of which only a fragment is preserved. The matter is arranged upon a system by which plants are classed according to their modes of generation, their localities, their size as trees or shrubs and herbs, and according to their uses as furnishing juices, potherbs, and seeds which may be eaten. The first book treats of the organs or parts of plants; the second of the reproduction of plants, and the times and mode of sowing. Here he mentions the sexes of plants, and describes the mode of reproduction in palms, and compares it with the caprification of figs. The third, fourth, and fifth books are devoted to

a consideration of trees, their various kinds, the places they come from, and the economical uses to which they may be applied. The sixth book treats of undershrubs and spiny plants; the seventh of potherbs; the eighth of plants yielding seeds used for food; and the ninth of those plants that yield useful juices, gums, resins, or other exudations. In this work there is much original and valuable observation, but at the same time it is intermixed with many absurd statements with regard to the functions and properties of plants. It is probable that much of the valuable matter recorded in this work was the result of his own observation, as he is known to have travelled about Greece, and to have had a botanic garden of his own, whilst he was probably dependent on the statements of soldiers and others connected with the armies of Alexander for his information on Indian, Egyptian, and Arabian plants.

Theophrastus wrote also another work, 'On the Causes of Plants,' *περὶ φυτῶν αἰτιῶν*. This work was originally in eight books, six of which remain entire. It treats of the growth of plants; the causes which influence their fecundity; of the times at which they should be sown and reaped; the modes of preparing the soil, of manuring it, and of the instruments used in agriculture; of the odours, tastes, and properties of many kinds of plants. In this, as in the 'History of Plants,' the vegetable kingdom is considered more in reference to its economical than to its medical uses. In both works there is much valuable matter that deserves the attention of the botanist, and a very little knowledge of botany will enable the reader to separate the chaff from the wheat. The latest edition of the 'History of Plants' was published at Oxford, in 1813, by Stackhouse. This edition is accompanied with a Syllabus of the genera and species of the 500 plants described by Theophrastus, also a glossary, and notes, with a catalogue of the editions of the botanical works of Theophrastus. The 'History of Plants' was translated into German by Kurt Sprengel, and published at Altona, in 1822, 8vo.

THEOPHYLACTUS SIMOCATTA, of Locri, was living about 610-629 A.D. He wrote a 'Universal History' in eight books, from the death of the Emperor Tiberius II., in 582, to the murder of Maurice and his children by Phocas, in 602. This work is known by the Latin title of 'Historiæ Rerum à Mauritio gestarum Libri VIII.' It was printed, with a Latin translation, by J. Pontanus, at Ingolstadt, 1604, 4to. It is also contained in Niebuhr's collection of the Byzantine writers.

THEOPHYLACTUS, a native of Constantinople, was archbishop of Achris, the chief city of Bulgaria, about the year 1070 or 1077. He wrote a work on the 'Education of Princes' (*παιδία βασιλικὴ*), for the perusal of Constantinus Porphyrogennetus, the son of Michael VII. and the Empress Maria. This work forms a part of the collections of Byzantine writers.

Theophylactus is better known by his valuable commentaries on the twelve minor prophets and the greater part of the New Testament, which are chiefly compiled from the works of Chrysostom. He also wrote 75 epistles and several tracts. These works were printed in Greek and Latin, at Venice, 1754, folio.

THEOPOMPUS, a Greek historian, a native of the island of Chios, was born about B.C. 380, and was instructed in rhetoric by Isócrates during his stay in Chios. Photius states that Theopompus and his father Damasistratus were obliged to quit their native island on account of their partiality towards Sparta. He went with his father to Asia Minor, where he spent several years in travel and study, and acquired great celebrity for his eloquence. At the age of forty-five he obtained leave to return to his country through the interference of Alexander the Great. After this event he took an active part in the political affairs of his native island, and by his talents he became one of the principal supports of the aristocratic party. So long as Alexander the Great lived, his adversaries could not venture anything openly against him; but no sooner had the king died than the popular party again expelled Theopompus. He now took refuge in Egypt under the protection of Ptolemæus, the son of Lagus, during whose reign he remained unmolested. But his successor Ptolemæus Philadelphus was ill-disposed towards him, and Theopompus was advised by some friends to quit the country. It is probable that he died about or shortly after 308 B.C.

The loss of the works of Theopompus, of which we now only possess numerous fragments, is one of the greatest that ancient history has sustained. He made an abridgment (Epitome) of Herodotus. He also wrote a history of Greece from the time where Thucydides breaks off, B.C. 411, to the battle of Cnidus, B.C. 394. Many fragments of this work are preserved. Theopompus also wrote the history of Philip of Macedonia and his time, in 58 books. The fragments of Theopompus were collected by Wichers, 1829, and are in C. and J. Müller's 'Fragmenta Historicorum Græcorum,' Paris, 1841.

THEORBO, a musical instrument of the lute kind, which has long fallen into disuse. The upper and middle strings were attached to the lower head or nut; the lower, or base strings, to an upper or additional one. [LUTE.]

THEOREM (*θεώρημα*) means properly a thing to be looked at or seen; and is used in mathematics to signify any proposition which states its conclusion or makes any affirmation or negation; as distinguished from a Problem, which demands or requires a conclusion to be arrived at, without so much as stating whether that conclusion is even possible. Thus, 'Required to draw a tangent to a circle at a given point,' is a problem; but 'If a straight line be drawn at right angles to a diameter from its extremity, that straight line is a tangent to the circle,' is a theorem. The problem asks discovery both of method and demonstration; the theorem asks demonstration only.

THEORIES OF MOLECULARITY. This important branch of science is directed to connect the known mechanical, dynamical, and hydrodynamical laws with those which govern the crystallisation of solids, the operation of heat in producing liquidity and gaseity, the action of capillary

tubes on fluids, and several other phenomena of constituted matter.

The first theory on this subject may be thus stated: that the particles of matter possess the attraction of cohesion, but are repulsed by the action of heat or caloric: when the former preponderates, the body is solid; when both are equal, it is in a fluid state; and when the latter exceeds the former, the body is a gas, and prevented from total dispersion only by the action of gravitation. A second hypothesis, which of late has been more generally received both by chemists and mathematicians, is that the particles of matter are mutually attractive by a law analogous to that of gravitation, but are surrounded by atmospheres repulsive one of the other, in the same manner as the particles of elastic fluids.

THEORY, THEORY AND PRACTICE. By theory, properly speaking, is meant the mode of making seen and known the dependence of truths upon one another. The use of this word has enlarged with the boundaries of the sciences. For example, before the discovery of universal gravitation, all that was known of any one planet was the empirical formula for one or two of its inequalities. This constituted the theory of the planet (then so called): thus the theory of the moon consisted in the statement of the laws of the inequalities called the equation of the centre, the evection, &c. In our day the point of view is changed; it is no longer the mere exhibition of these inequalities which constitutes the theory, but the deduction of them, as necessary consequences, from the principle of gravitation.

Before coming to the distinction between theory and practice, we must observe that theories may be divided into two classes, the more perfect and the less perfect. We cannot say that any theory is absolutely perfect; but there are some, of which the defects are hardly perceptible, and others in which the contrary is the case. These last, instead of being all-sufficient guides, are only helps, the services of which are to be used to an extent which discrimination derived from practice and experience must point out. Many a person who thinks he is proceeding upon experience only, is really making use of a mixture in which there is theory, though his own knowledge of the process he uses, and of its history, may not be sufficient to inform him of it.

A person who uses an imperfect theory with the confidence due only to a perfect one, will naturally fall into abundance of mistakes: his predictions will be crossed by disturbing circumstances of which his theory is not able to take account, and his credit will be lowered by the failure. And inasmuch as more theories are imperfect than are perfect, and of those who attend to anything, the number who acquire very sound habits of judging is small, compared with that of those who do not get so far, it must have happened, as it has happened, that a great quantity of mistake has been made by those who do not understand the true use of an imperfect theory. Hence much discredit has been brought upon theory in general; and the schism of theoretical and practical men has arisen. Fortunately there are many of the

former who attend properly to the improvement of imperfect theory by practice; and many calling themselves practical, who seize with avidity all that theory can do for them, and who know that step by step theory has been making her way with giant strides into the territory of practice for the last century and a half.

By practice, as distinguished from theory, is meant (not by us, but by those who contend for the distinction) the application of that knowledge which comes from experience only, and is not sufficiently connected with any general principles to be entitled to the name of a theory. The distinction of labourers in the field of science or art into theoretical and practical, is not strictly a just one, for there is no theorist whose knowledge is all theory; and there is no practical man whose skill is all derived from experience. But the terms will do well enough to distinguish two classes whose peculiarities it might be difficult to define exactly.

The practical man, when he is really nothing more, is one who can just do what he has been taught to do, and who has acquired skill and judgment in a small range of occupations. All who pride themselves upon the title would be displeased at this definition, and we readily admit that many of them are entitled to a higher character; but only because the name by which they delight to describe themselves is a wrong one. They desire, under the name of a workman, to claim the qualities of a master. The term *theoretical* serves, as one of contempt, to designate anything of which they disapprove; and as there never is any fallacy which is not carried to a fool's-cap extent by the lower order of users, it would not be difficult to make a most amusing selection of instances of the manner in which the distinction has been worked by the large number who are at the bottom of the class, and in whose heads it runs that their own ignorance is practical, and others' knowledge theoretical. We remember seeing a theorist, as he was called, endeavouring to make the managers of a certain undertaking comprehend that their profits could not exceed the excess of the gross returns over the outlay, after they had been trying to cheat the equation, by inventing names for what they would have liked to have, but which the theorist assured them they would not get, for the preceding reason. The answer was, 'That is very true theoretically, but now let us look at it practically.' We shall say no more of the gross abuse of the terms, except to remark, that were it worth while really to make a contest between theory and practice, it would be difficult to say on which side the balance of absurdity would incline; or whether the man who is too confident in his theory, or too confident in his experience, has done most mischief for the time being.

Coming now to the higher class of practical men, and speaking as of the balance between two methods, the value of both of which is admitted, we observe that there are obvious faults to which both parties are subject, both in conduct and in argument, respecting their pursuits. Great care is necessary to secure the theorist from pushing an imperfect theory too far, and neglecting causes of

disturbance; but at least as much is necessary to prevent the practical man from generalising into theory from imperfect experience, or from restraining inquiry by a notion formed from practice. This is his besetting sin, to such an extent that we should almost be inclined to say that the fault of a practical man is a tendency to form false theory, as that of the theorist is to make false applications. We have often been surprised at the boldness with which the former assert generalities, upon evidence which would only make a pure theorist look for further information. Analogies are of all things the most deceptive.

In argument there is one mode which is common to both parties, and which is exceedingly detrimental. It is the selection of instances from the very highest minds of the two orders, to illustrate the effects of theory or practice upon the general mass of understandings: minds the superior calibre of which, and their power of adapting themselves to circumstances, and making the most of what they have, render them exceptions to all rules, and no proper examples of the most advantageous course of training. Every one likes, no doubt, to draw consequences about and concerning his own self from a contemplation of the minds and methods of the Newtons or the Galileos of a higher sphere of intellectual existence, or the Arkwrights or Telfords of a better state of power of adaptation. 'What is your theory good for?' says the tongue attached to some head which holds about the same weight of conceit that Telford's did of sagacity. 'Telford knew nothing of it, and I may do without it too.' Bacon observes, 'the root of all the mischief in the sciences is, that, falsely magnifying and admiring the powers of the mind, we seek not its real helps,' a maxim full of meaning, and a lesson to him who rates theory too highly, and also to the one who thinks that the only use of his mind is to arrange the results of experience, his own or that of others. What are the majority of men, that they should look down upon any course of training, theoretical or practical?

Another fault of argument, but almost peculiar to the practical world, who have the force of numbers on their own side, is the habit of claiming all who are successful in application as instances of their own method and knights of their own order. Suppose that one individual should discover a mine, work it with his own hand, purify the ore, and beat the metal into a horse-shoe; which is he, a geologist, miner, furnace-man, or blacksmith? He has done the work of all, but the community of blacksmiths would hardly be allowed to claim him as peculiarly belonging to themselves. When a person who has mastered the difficulties of theory has also successfully applied them, he is free of both corporations; but those who attend to application only, never fail to appropriate his merits. Watt is a striking instance. He was a highly-accomplished theorist on every point on which he worked; and yet his name has been frequently cited as a proof that theory could be dispensed with. And his career, when compared with that of Telford, will illustrate theory applied to practice, as distinguished from practice alone, however acute. It is impossible to contemplate the career of Telford

without a feeling of high interest, created by the comparison of his apparently inadequate education with his startling sucesses. Looking at the individual himself, there is everything for his age to admire; and as long as his structures last, each of them is the *monumentum*, but not *ære perennius*. The time will come when his name shall be like that of the builder of the old London Bridge, who was no doubt the Telford of the day, a stimulus to his contemporaries, useful and honoured, but not the remembered of succeeding ages. On the other hand, the discoveries of Watt, though equally startling in what is called the practical point of view, have the mind of the discoverer impressed upon them, and have been, and must be, the guide of his successors, not merely to repetitions of what he did himself, but to enlargement of ideas, and to the conversion of principles into forms useful in art. Take away the honourable qualities which enabled the two men to outstrip their contemporaries, each in his line, qualities which are the properties of the individual minds, and consider what is left, namely, their modes of proceeding: consider the effect of these two modes upon men in general, and there is nothing in that of Telford which would raise the workman above a workman, while in that of Watt, there is the vital principle to which we owe all the mechanical triumphs of civilisation and all the theoretical successes of philosophy.

This country has been long and happily distinguished for the great attention which has been paid to application; but it is a mistake to suppose, as some do, that our supremacy in practical matters has been co-ordinate with, still less owing to, neglect of theory. It would be easy to show, that though the comparative neglect of theory alone, as a pursuit, added to its diligent cultivation on the Continent, has given to foreign countries a decided preponderance of theoretical inquirers and writers, yet that there has been no country in Europe in which a competent knowledge of the mathematics and their applications has been spread over so large a mass, or raised to so high an average, as in our own. Since the beginning of the 17th century the total amount of theory in Britain has been larger than in any other European country, on account of the numbers who have possessed a useful amount of knowledge. For ourselves we are perfectly satisfied, however little those most concerned may know it, that this greater diffusion of theory has been the original moving cause of the practical excellence to which we have alluded. If those who have become known for splendid achievements in the former are few, the same may also be said of the latter; but a country owes its excellence in either department, not to one or two of the highest, but to the mass of those who have competent knowledge, producing good habits of thought and action. It is a new thing to hear one branch set against the other, and would make our writers of a century back think that posterity had lost its senses. The only addition wanted has been some means of systematically nurturing the growth of theory, so that, well as we have done with what we have, we may do better with more. Whatever the force

of genius may do for an isolated exception, the mass of mankind must place their best hope of progress in the union of theory and practice.

There is also a mode of viewing what we may call the action of theory, which is absolutely necessary to a true conception of the value of their labours who employ their time in its advancement. Watch the arguments of a person who calls himself, distinctively, a practical man, and it will be always found that a well-established theory, fifty years old, is practical knowledge, so called. To this there cannot be the slightest objection in the non-distinctive sense: a well-established theory, which has been shown to be sufficient, is practical, as opposed to one of which the investigation is more recent, and the completeness not so well ascertained. But when the question is theory, as theory, against practice, as practice, the advocates of the latter frequently find it convenient to assume, for their own share of the matters in contest, all the best theories plus the most recent practical knowledge, leaving to the other side the onus of supporting theory upon the most imperfect part of the mass of doctrines which it contains, being that part which is not yet off the anvil. Suppose a merchant going into the bail court to prove his being worth a certain sum; he is asked whether his business, all debts and risks allowed for, would produce that sum: he replies that his ventures must be beyond record unsuccessful, if it would not be so, over and over again. 'So then,' he is further questioned, 'you cannot positively swear that your business will make you worth the sum in question.' 'I cannot,' he replies, 'positively swear any such thing; but I have enough not employed in business, in land and mortgages, and in the funds, to pay twenty shillings in the pound five times over, upon every risk which I am liable to.' What would be thought of counsel who should retort, 'That is nothing to us; you are described as a merchant, and your solvency must be tried by the state of that part of your property which is now undergoing the fluctuations of trade?' Such is and always must be the state of theory; the amount which is actually realised is enormously greater than the floating balance which is being worked out. Those who are engaged in producing fixed capital from the latter have a right to the credit which arises from the interest of the former: their labours for the time being are not to produce their return at the instant.

We have, in compliance with common notions, not adverted to the consequences of theory upon the mind and thoughts of men, but have treated it as if its sole object were to advance the mechanical arts and better the physical condition of society. But this is under protest, that even if it could not be proved that rational investigation of nature had added one single atom to the physical comfort of life, there would remain such an enormous mass of social ameliorations which can be traced to that source as would outweigh even the triumphs of steam.

THEOTOCOPU'LI, DOMINICO, called *El Greco*, was a painter, sculptor, and architect. He is said to have been the scholar of Titian. In 1577 he was residing in Toledo, where he painted a great number of pictures.

As an architect he designed the Casa del Ayuntamiento, or mansion-house, of Toledo, and the churches of La Caridad and of the convent of the bare-footed Franciscans at Illescas; and he executed also a great part of the paintings and sculptures of these churches. In 1590 he designed the church of the Augustines at Madrid, and painted the principal altarpiece of their college. He designed also several monuments, which are among his best works. He died at Toledo in 1625, according to Palomino, 77 years of age. El Greco's pictures were very numerous in Spain at the end of the last century. Many have probably since been removed.

His son, *George Manuel Theotocopuli*, was also a sculptor and architect of some eminence. He died at Toledo in 1631.

THERA, now called *Santorin*, is an island in the Grecian Archipelago, about 60 miles N. from Crete. It is in the form of a crescent, with its two points stretching to the W. No part of the island is more than 3 miles across, and in some parts it is not more than seven-tenths of a mile. The coast-line along the outer curve is 18 miles, and along the inner about 12 miles. Opposite to the inner curve is the small island of Therasia, and in the basin formed by these two islands are three islands much smaller than Therasia. A fourth small island, called Aspro Nisi, lies between the south-western point of Thera, and the south-eastern point of Therasia. If the passage, about a mile wide, which separates the northern part of Therasia from the north-western part of Thera, were filled up, and also the passage between the south-east extremity of Therasia and the south-western point of Thera, which passage is more than 2 miles wide, and in the middle of it is Aspro Nisi,—the oval-formed basin, near 18 miles in circumference, would present the appearance of the huge crater of a volcano: for the shores round the inner curve are frightful precipices, of the colour of iron dross, except where the summits are capped with a deep layer of pozzolana. These steep shores of Thera vary in height from 500 to 1200 feet, and in slope from 45° to the perpendicular. Along the edge of these precipices the principal towns of the island are built. The land slopes down from these high cliffs to the low shore of the outer curve.

All the northern half of Thera is composed of volcanic materials. The southern half contains the Greater Elias, which is of limestone, and the highest land in the island, being 1887 feet above the sea. The eastern shores of Therasia correspond to the western shores of Thera in height and strata: this island also slopes rapidly off to the opposite side, the shores of which are low. The greatest depth of soundings in the basin is between the opposite shores of Thera and Therasia, which are highest; and here the depth is about 200 fathoms. The islands of Therasia and Aspro Nisi are said to have been separated from Thera by an eruption, which Pliny mentions ('Hist. Nat.,' iv., 12, ed. Hard.). The three small islands in the centre of the crater have been thrown up by volcanic agency within the last 21 centuries: the Greeks call them Kaimeni, or burnt

islands. The last of the three islands was thrown up in 1573.

The population of Thera in 1848, including that of Therasia, was about 14,380, the great majority of whom are Christians of the Greek Church. The island is divided into a great number of small farms, which are carefully cultivated. It produces barley, beans, vetches, cotton, and figs; but the principal produce is wine. Above 50,000 barrels, of which 7 make a pipe, of the Vino Brusco, are annually produced; and above 2000 barrels of the Vino Santo. The Brusco is a dry pale wine, and very good. The Santo is sweet and luscious, and said to be little inferior to the wine of Cyprus. Above 11,000 baskets of dried grapes are also annually produced by this industrious population, who live on the fragments of the crust of a volcano. The wine is principally sent to Odessa and Taganrog, whence grain is imported. The imports comprehend nearly everything that is necessary for life, and even wood. The total sum annually paid into the Greek treasury by Thera is about 61,000 drachmæ, which is prædial, or raised from the land. In point of importance Santorin ranks next to Syra and Patras.

Thera, originally called Calliste, or the most beautiful, was first inhabited by Phœnicians, who are said to have been left there by Cadmus. It was subsequently colonised by Theras with a mixed colony of Minyans and Spartans (Herod, iv., 147, 148), and always remained faithful to its mother-city Sparta. This island and Melos were the only islands of the Cyclades that remained faithful to Sparta at the beginning of the Peloponnesian war. (Thucyd., ii., 9.) But Thera has acquired its chief importance from having founded the colony of Cyréne in Africa, under the guidance of Battus, in B.C. 631. (Herod. iv., 150, &c.)

This short notice is compiled from the valuable paper in the 'London Royal Geographical Journal,' vol. xx., on the 'Volcanic Group of Santorin or Thera,' by Lieut. E. M. Leycester, R.N. The paper is accompanied with a map of the group from the survey of Capt. Thos. Graves.

THERA'MENES was a native of Ceos, and the adopted son of Hagnon, or Agnon, an Athenian. In B.C. 409, in conjunction with Antiphon, Phrýnichus, and Pisander, he endeavoured to upset the democratical constitution of Athens. In B.C. 410 he took part with Thrasybúlus in the battle of Cyzicus, and, in B.C. 406, in the battle of Arginúsæ. On this occasion, on which the Athenians gained a glorious victory, many lives were lost in the wrecks of their ships, which it was thought might have been saved if proper care had been taken. Theramenes and Thrasybulus had been commissioned by the Athenian generals to take care of the wrecks and to save the men, but they were prevented by a storm from accomplishing this object. The generals were summoned to Athens, and put on their trial, and six of them who were present were put to death. The blame of this act of cruelty falls mainly on Theramenes, who was base enough to appear foremost among the accusers.

In the following year (B.C. 405), shortly after the battle of Ægos Potami, Theramenes, who though he belonged to the oligarchical party, yet kept up the appearance of a friend of the people, offered to go as ambassador to Lysander, who was blockading the city, while famine was raging within. He went to the camp of Lysander, where he stayed three months, hoping that in the meantime the city would be reduced to such a state of weakness as to accept any terms, or that in the interval the oligarchical party would gain the ascendancy. When he returned to the city he said that he had been detained by Lysander, who had no power to decide on the terms of peace. He was then sent to Sparta with nine colleagues to negociate. The Spartans were willing to grant peace on condition that the long walls and the fortifications of Piræus should be demolished, that all ships of war with the exception of twelve should be delivered up to them, and that Athens should join the Peloponnesian confederacy, and follow Sparta both by land and sea. When Theramenes and his colleagues returned to Athens, the famine had reached its height, and the terms, after some opposition, were accepted.

Theramenes now proposed that the supreme authority at Athens should be vested in thirty persons, who should draw up a new code of laws. Theramenes was one of the Thirty. The tyrannical conduct of these men spread alarm through Athens. The Thirty, in order to strengthen themselves made out a list of 3000 Athenians on whom a kind of franchise was conferred, while all the remaining Athenians were treated as outlaws. The cruelty and avarice of the Thirty grew worse every day, and it was determined that each of them should select one rich alien who was to be put to death, and whose property should be taken by his murderer. Theramenes refused to have any share in this crime. This refusal increased the fear of his colleagues, and they resolved to get rid of him. An accusation was brought against him in the name of the Thirty by Critias, the most cruel among his colleagues. He was charged with being hostile to the existing government, and with betraying its interests. Theramenes was handed over to the Eleven (the executioners), and compelled to take poison B.C. 404.

THERAPEUTICS constitute that department of medical science which relates to the composition, the application, and the modes of operation of the remedies for diseases.

THERESIENSTADT (*Maria-Theresienstadt, Maria-Theresianopel*) is a large town in the county of Bacs, in Hungary, 24 miles S.W. from Szegedin, in a plain called Telecska, on the high road to Semlin, in 46° 6′ N. lat., 19° 40′ E. long. In 1743 it was made a free market-town, by the name of Szent-Maria, with many privileges; and by the Empress Maria Theresa it was raised to the rank of a free city in Jan., 1779. Theresienstadt is not properly a town, but rather an assemblage of villages, and like many of the Hungarian towns it spreads over a very wide area. It is built without any regularity, and so scattered that many houses might be erected in the vacant sandy spots in the streets. There are a few con-

siderable buildings, viz. the church of St.-Theresa, the Franciscan church, and the Greek church, the gymnasium, the town-house, and the barracks. The town possesses a population of about 35,000. In the neighbourhood the breeding of cattle is very flourishing, and numerous herds and flocks, and studs of horses, constitute the riches of the inhabitants, who carry on a brisk trade in wool, cattle, horses, sheep, and raw hides. Linen, leather, and drugget, are the only industrial products, and these are the results of domestic manufacture.

THERMÆ. [Bath.]

THERMO-ELECTRICITY is a name given to the fluid excited by heat in conducting substances, as wires or bars of metal, generally of different kinds, when they are placed in close contact with each other, end to end, and disposed so as to form a periphery or continuous circuit; the effects of heat applied to the ends or junctions of the bars being made manifest by a magnetised and balanced needle deviating from its usual position in consequence of the application. The discovery of the principle was made in 1822, by Dr. Seebeck of Berlin, while engaged in researches concerning electro-magnetism, which but two years before had been discovered by Professor Oersted of Copenhagen; and the name was given to the fluid by the latter philosopher in order to distinguish it from that which is produced by the usual galvanic apparatus, which he proposed to call hydro-electricity.

When a slip of zinc and one of copper are bent so that, on the extremities being applied together, there is formed a parallelogram having the junctions of the slips in the middle of the shorter sides, and a compass needle is suspended within the circuit; on placing the apparatus in a plane coinciding with the magnetic meridian, with the longer sides parallel to the horizon (the copper slip being uppermost), and heating by the flame of a lamp the northern point of junction, the needle deviates towards the west: the apparatus being inverted so that the zinc slip is uppermost, on heating the northern junction as before, the needle deviates towards the east. It follows from this experiment that the fluid current, if such it be, which affects the magnetism of the needle, circulates about the copper slip in such a manner that when the latter is in a horizontal position its direction is from west to east, passing above the slip in a plane perpendicular to its length. This effect is similar to that which takes place, though in a contrary direction, when a magnetised needle is brought near a conducting wire joining the poles of an ordinary galvanic apparatus.

Effects similar to those which result from the application of heat take place when one extremity of the bar of antimony, or one of the junctions of the zinc and copper, is made colder than the other by means of ice.

In this country the subject of thermo-electricity has been diligently pursued by Professor Cumming of Cambridge; and the details of his researches are contained in a Memoir which is published in the 'Cambridge Philosophical Transactions' for 1823. From these it appears that all perfect conductors of electricity, on being heated or cooled in any part, exhibit in general magnetical phenomena; but the intensity of the action, which is indicated by the amount of the deviations produced in a magnetised needle, is not the same in all substances, and with some the direction of the current is contrary to that which is produced in others. In the same Memoir there is also an account of several curious anomalies which were observed in the magnetic action: one of these is, that when iron wire is used to touch the metals examined, of which one is iron, the needle deviates a certain number of degrees in the positive direction; then, as the heat of the wire is increased, the deviation in that direction gradually diminishes till it becomes zero; after which the deviation takes place in a negative direction, and it becomes a maximum in this direction when the wire acquires a red heat.

THERMO'METER (from the Greek words *θερμὸς, hot,* and *μέτρον, a measure*) is an instrument by which the temperatures of bodies are ascertained. It consists of a glass tube with a capillary bore containing in general alcohol or mercury, which expanding or contracting by variations in the temperature of the atmosphere, or on the instrument being immersed in the liquid or gas which is to be examined, the state of the atmosphere, liquid, or gas, with respect to caloric, is indicated by a scale which is either applied to the tube or engraven on its exterior surface.

The end proposed by a thermometer is the measurement of the temperature of any body with relation to the temperature of some other substance, as of water at the point of freezing; but the measure so obtained must not be understood to express the absolute quantity or density of caloric in any body, it being well known that different substances, though exhibiting the same apparent temperature, contain very different quantities of caloric according to their *capacities* for that element.

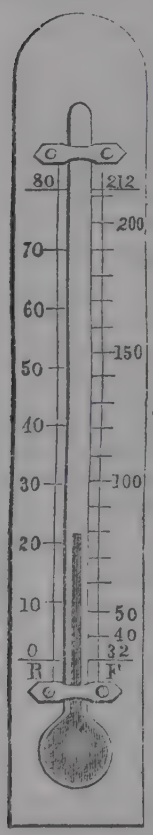
The thermometer was in use in the beginning of the 17th century, but it is not known precisely to whom the honour of the invention is due. A physician of Padua named Santorio, in his 'Commentaries on Avicenna' (1626), claims it for himself. It may however have happened with this, as with other scientific discoveries, that the idea of the instrument occurred to two persons or more about the same time.

Of the earliest kind of thermometer it may be sufficient to state that it consisted of a long glass tube containing air, which was hermetically sealed at the upper end, while the lower was made to enter into a vessel of coloured spirit. By the pressure of the atmosphere the spirit was made to occupy part of the tube; and the variations in the temperature of the atmosphere causing the column of spirit to ascend or descend in the tube, allowed the degree of temperature to be measured by a scale applied to the latter.

The defects inseparable from such thermometers are, that the dilatations of the air are not proportional to the increments of heat, and that the length of the column of spirit varies with the temperature of the atmosphere. Thus the indica-

tions afforded by the thermometer are rendered erroneous, or require corrections which it is difficult to apply.

About the middle of the 17th century the members of the Accademia del Cimento caused thermometers to be constructed in which, instead of air, alcohol, or spirit of wine, was employed. Alcohol dilates and contracts considerably with the variations of temperature to which it may be subject, though not in so great a degree as air. It is also capable of measuring very low temperatures, but as it is brought to a boiling state sooner than any other liquid, it cannot be employed to ascertain a high degree of heat.



The idea of employing mercury for the purpose of measuring degrees of heat by its expansion is supposed to have first occurred to Dr. Halley. The invention is ascribed to Römer, but it was not till 1724 that such a thermometer was known in this country. In that year an account of a mercurial thermometer which had been invented by Fahrenheit, of Amsterdam, in 1720, was read before the Royal Society, and was published in the 'Philosophical Transactions' (vol. xxxiii.). The advantages of mercury over alcohol and air, as a measure of temperature, are that its expansions are more nearly proportional to the increments of caloric than those which take place in either of the other fluids; it is easily deprived of air; and its power to conduct heat being considerable, the changes of its volume by changes of temperature in the surrounding medium take place more rapidly than those of any other fluid except the gases.

The scale which has been in general use in this country since the year 1724, is supposed to have been invented by Fahrenheit. It is quite unknown on what ground he made choice of the fixed points on his scale, or the number of graduations between them; but it is thought that one of the fixed points was that of boiling water, and that the other, which is the zero of the scale, was that at which the top of the column stood when the instrument was exposed to an intense cold in Iceland, in 1709. The extent of the scale between this last point and that of boiling water is divided into 212 parts, and the point of freezing water is at the thirty-second division from the zero point. (See the scale on the right of the tube in the above figure.) That which is called Réaumur's scale has the interval between the points of freezing and boiling water determined by experiment, and the distance between them is divided into eighty parts, the zero of the scale being at the freezing point. (See the scale on the left of the tube in the above figure.)

A third scale, called 'Centigrade,' has been much in use among the philosophers of the Continent within the last fifty years. It was invented by Celsius, a Swede, and it differs from that of

Réaumur only in the distance between the points of freezing and boiling water being divided into 100 parts. The length of each degree in this thermometer, as well as in that of Réaumur, is greater than in the scale of Fahrenheit; and consequently the indications of temperature when the top of the spirit or mercury is between the lines of division, are rather uncertain, from the difficulty of estimating them accurately by the eye: also, the temperatures required to be determined being often below the point of freezing-water, the employment of negative signs is of more frequent occurrence with these thermometers than with those of Fahrenheit.

The following formulæ will serve to convert any given number of degrees on Fahrenheit's scale into the corresponding number of degrees on Réaumur's and the Centigrade scales, and *vice versâ*.

Let F, R, and C, express any corresponding numbers of degrees on the three scales respectively: then—

$$(F - 32^\circ)\frac{4}{9} = R, \text{ and } (F - 32^\circ)\frac{5}{9} = C:$$

$$\frac{4}{9}R + 32 = F, \text{ and } \frac{9}{5}C + 32 = F:$$

$$\text{also, } \frac{4}{5}C = R, \text{ and } \frac{5}{4}R = C.$$

N.B. When F is between zero and 32°, the values of R and C are negative, and express the required number of degrees below zero on Réaumur's and the Centigrade scale. Also, when F, R, or C expresses any given number of degrees below zero on its proper scale, it must be considered as negative.

It may be observed that the situation of the freezing-point on the scales of thermometers can be determined with great accuracy if the ball and part of the tube be immersed in pounded ice; for it is known that water containing ice remains of the same temperature till the ice is entirely dissolved. But the point of boiling water is far from being so precisely known, since it varies with the density of the atmosphere at the time of making the determination. Distilled water in an open vessel, and under a given pressure of the atmosphere, boils at an invariable temperature, except as far as the nature of the vessel may make some difference; for if the heat communicated to the water be increased, the only effect produced is that of driving off a greater quantity of steam in a given time. In a vessel exhausted of the air the water will boil at a temperature expressed by 98° or 100° of Fahrenheit's scale, while in a vessel constructed so as to prevent the steam from escaping it will remain in a liquid state at a temperature expressed by above 400°. In order therefore that the temperatures indicated by different instruments may agree together, it is recommended that this point should be found from water boiling in the open air at a time, if possible, when the height of the mercurial column in the barometer is 30 inches, and when the temperature of the air is indicated by 55° of Fahrenheit's scale.

Thermometer-tubes should have their bores very slender, and, if possible, perfectly equable in the whole of their length. When there is any inequability in the transverse sections, the best artists make the graduations of the scale vary so that they may correspond to the equal divisions of a cylindrical tube. It is usual to give to the bore an oval form with the broader side towards the front, in order that the mercury or spirit may be easily distinguished at a certain distance, as by approaching very near the instrument, the heat of the observer's person may affect the length of the column.

According to the experiments of Mr. Dalton, mercury does not boil till it has acquired a temperature equal to 660° of Fahrenheit's scale; and it does not freeze till it is subject to a degree of cold expressed by 39 divisions below the zero of that scale, or 71° below the freezing-point of water. Pure alcohol, on the other hand, has never been frozen, though it has been exposed to a degree of cold exceeding that which is expressed by 91° below the zero of Fahrenheit; and therefore a spirit-thermometer is to be preferred to one of mercury when it is intended to ascertain the temperature of the air in high northern or southern latitudes: but since the spirit boils in air with a degree of heat expressed by 175° of Fahrenheit, it is unfit for many of the purposes for which a thermometer is required. For instruments capable of measuring very high temperatures, see PYROMETER.

Water, like other substances, suffers a diminution of volume by the abstraction of caloric, but when it is cooled to a temperature between 39° and 40° of Fahrenheit's scale, it seems to have attained the maximum of density; and if the process of cooling be continued, it then increases in volume till it is converted into ice. Therefore if a thermometer were made with water, and the top of the column were at 50° Fahr., it would be impossible to know whether the temperature were 50° or 30°, the expansion being nearly equal at equal distances within 10° above and below 40° of the scale. The cause is uncertain, but it is probably owing to a partial crystallisation, which may begin to take place in water when at a temperature expressed by about 8° above its freezing-point.

Register Thermometers.—It is of great importance in meteorology that the observer should be able to ascertain the highest or lowest point of a thermometer scale at which the column of mercury may have stood during his absence; and several contrivances have been adopted by artists in order to obtain this end. Of these, one, which is still preferred, was invented by Mr. Six, whose name the instrument bears, and is described in the 'Philosophical Transactions' for 1782. It consists of a long tube bent so as to form three parallel branches, of which the central branch is an elongated bulb, and the rest of the tube has a capillary bore. The lower portion of the bent tube contains mercury, which rises in the two side branches to certain points, and the bulb is filled with spirit of wine, which passing over a bend at the top descends to the upper extremity of the mercury in one of the branches; the upper end of the other branch is also filled with spirit, and this is hermetically sealed.

Two small indices of steel coated with glass are introduced in the branches, and are capable of being forced upwards by the rising of the column of mercury in either tube, and they have about them a fine wire or a thread of glass; so that they will remain stationary where they happen to be when the heads of the columns recede from them. Their lower extremities consequently indicate the points at which the ends of the columns may have stood before such recess.

An instrument of this kind is generally used for ascertaining the temperature of the ocean at considerable depths, or of the atmosphere at great heights.

Differential Thermometer.—This instrument, which was invented by M. Sturmius, of Altdorf, before the year 1676, and was revived by Professor Leslie in 1804, consists of two thermometer tubes, terminating, at one extremity of each, in a hollow glass ball, and containing coloured sulphuric acid: the opposite extremities are united by the flame of a blow-pipe, and an enlargement of the bore is made at the place of junction. The tube is then bent so as to form three sides of a rectangle, the two balls, which are of equal diameter, forming the upper extremities of two sides; and the instrument is on a stand with the branches of the tube in vertical positions. When the temperature of the air in the two balls is the same, the acid occupies one side and the base, and rises a little way up the other side of the rectangle. To the latter side is attached a graduated scale, with the zero of which the upper extremity of the acid in that branch should coincide. In the event of this adjustment being deranged, it may be restored by causing a small quantity of air to pass from one ball to the other, which is done simply by the warmth of a hand applied to that ball from whence the air is to be driven.

The variations of temperature in the apartment will evidently have no effect on the instrument, since the action upon the two balls will be equal; but if one ball alone be heated, the rise of the acid in the other will immediately indicate the difference between the temperatures of the media about the two balls by the excess of the expansion of the air in one ball above the expansion in the other. The delicacy of the instrument is such that the least difference of temperature is immediately made sensible by the movement of the acid.

Radiating Thermometer, or *Actinometer*. See ACTINOMETER.

THESEUS, the great national hero of Athens, is said to have been born at Trœzen. His father was Ægeus, king of Athens, and his mother was Æthra, the daughter of Pittheus, king of Trœzen. The legends about Theseus are told in Plutarch's life of him. But he is also represented as the founder of the Attic commonwealth, and even of its democratical institutions.

Before his time it is said Attica contained many independent townships, which were only nominally united. Theseus incorporated the people into one state, removed the principal courts of the

administration of justice to Athens, and greatly enlarged the city. To cement their union he instituted several festivals, and especially changed the Athenæa into the Panathenæa, or the festival of all the Atticans.

THESIS. [ARSIS.]

THESMOPHO'RIA, a festival with mysteries in honour of Deméter (Ceres), to whom all the institutions of civilised life, especially of civil and religious laws, were attributed. The festival of the Thesmophoria especially referred to this part of the character of the goddess, as is clear from several of the ceremonies observed at its celebration, and from the surname of the goddess, 'Thesmóphoros,' from which the festival derived its name. It was celebrated in various towns in Greece, and in the Greek colonies, as Sparta, Thebes, Eretria, Ephesus, Syracuse, Agrigentum, and others. But the place where it was held with the greatest solemnity, and where the particulars of its celebration are best known, was Athens. Its celebration was confined to women, especially married women.

THESPE'SIA, the name of a genus of plants belonging to the natural order *Malvaceæ*. *T. populnea*, Poplar Thespesia, is a native of the East Indies, Guinea, and the Society Islands; and is by the British colonists called the Umbrella Tree. It attains a height of about 40 feet, and has large yellow flowers with a dark-red centre. In the tropics it has gained for itself a sacred regard, and is planted about monasteries and convents; hence the name Thespesia (divine). There are two species natives of South America: they are all trees with handsome showy flowers.

THESPIS, a native of Attica, who lived in the time of Solon and Pisistratus, about 535 B.C. The ancient traditions unanimously represent him as the inventor of tragedy. But the invention of Thespis consisted in nothing else than in introducing a person, who, at the Dionysiac festivals in the city of Athens, entered into conversation with the chorus, or related a story to it. The designation of this actor was Hypócrites (ὑποκριτὴς), that is the 'answerer,' because what he said or acted answered or corresponded with the songs of the chorus. By means of masks, the invention of which was likewise ascribed to Thespis, he was enabled to act different characters one after another. Whether Thespis wrote his plays is not certain.

THESPRO'TIA, a district of the ancient Epirus, around the river Ácheron. The district seems to have included the coast from the mouth of the Ambracian Gulf northwards to the river Thýamis, and the country inland as far as the Mount Tómarus.

Thesprotia was one of the chief abodes of the Pelasgi. In Thesprotia was the oracle of Dodóna (Herod., ii. 56), the chief seat of the old Pelasgic religion. [DODONA.] In Thesprotia Aristotle found the Hellénes, under their ancient name of Græci (Γραικοὶ, Arist., 'Meteorolog.,' i.14.)

Among the chief cities was Nicópolis, built by Augustus on the peninsula opposite the promontary of Acte, or Actium, in commemoration of his victory over M. Antonius.

THESSALONIANS, *Epistles of St. Paul to the.* Christianity was introduced among the Thessalonians in A.D. 50, by St. Paul, when he first passed over from Asia Minor into Europe to preach the gospel. Though many were converted, the Jews stirred up a tumult against Paul and his fellow-labourers, Silas (Silvanus) and Timothy, and Paul withdrew, first to Athens and thence to Corinth.

St. Paul wrote his First Epistle to the Thessalonians, A.D. 52, from Corinth, and not from Athens, as the subscription of the epistle imports. It was one of the earliest, if not the very first, of all St. Paul's epistles, and its genuineness has always been admitted. The immediate occasion of St. Paul's writing this epistle was the favourable intelligence brought by Timothy of the steadiness with which the Thessalonians adhered to Christianity in spite of the persecution with which they were assailed by their own countrymen.

The Second Epistle to the Thessalonians was written soon after the first, and from the same place. It seems to have been occasioned by the information which St. Paul received on the state of the church at Thessalonica from the messenger who conveyed his first letter to the elders of the church, and his report of the effect produced by its contents.

The undesigned coincidences between this Epistle and the 'Acts of the Apostles' are given in Paley's 'Horæ Paulinæ.'

THESSALONI'CA, (now *Saloniki*), an ancient city of Macedonia, in the district of Mygdonia, was formerly called Therme or Therma: it is in 40° 38′ N. lat. and 22° 56′ E. long., about ten miles east of the ancient river Echedórus, at the head of the modern Gulf of Saloniki, formerly called the Thermaic Bay, from the ancient name of the city. According to Strabo, the name of Thessalonica was given to it by Cassander, the son of Antípater, in honour of his wife Thessalonica, who was the daughter of Philip, king of Macedon, and the sister of Alexander the Great. Cassander collected together (about B.C. 315) the population of several adjacent towns, so as to make it one of the most important cities of Northern Greece. After the battle of Pydna (B.C. 168), in which the Romans defeated Perseus, the then king of Macedonia, Thessalonica, with the other Macedonian towns, surrendered to the Romans, and was made the capital of the second of the four regions into which Macedonia was divided by them. Livy speaks of it as being then a very celebrated city, to which its admirable position materially contributed. In St. Paul's time it was much frequented by people of different nations, and it was also the seat of the Roman government. Under the latter empire, it was a flourishing and important city, the residence of the prefect of Illyricum, and the metropolis of the Illyrian provinces. In the reign of the Emperor Theodosius it was the scene of a deplorable calamity. [THEODOSIUS; AMBROSE, ST.]

THESSALY (Θεσσαλία), one of the principal divisions of Northern Greece, is an extensive and generally unbroken plain, about 80 miles in extreme length and 70 in breadth, comprising an area of about 5500 square miles, and forming an irregular sort of square.

The above description applies only to what may be called Thessaly Proper, which is bounded on the west, towards Epirus and Athamania, by the range of Pindus; on the north, towards Macedonia, by the Cambunian Mountains; on the south by the range of Mount Othrys; and on the east by a range of mountains running along the coast nearly parallel to Pindus, and including the summits of Pelion and Ossa. The basin of Thessaly is thus surrounded by mountain-barriers, broken at the north-east corner only by the valley and defile of Tempe (or the Cut), which separates Mount Ossa from Olympus, and presents the only road from Thessaly to the north which does not lead over a mountain-pass. At the eastern base of the mountain-range which runs from Tempe to the Bay of Págasæ, now the Gulf of Volo, there is a narrow strip of land called Magnesia, between the hills and the sea, interrupted in several places by lofty headlands and ravines, and without any harbour of refuge from the gales of the north-east. South of Othrys, the southern boundary of Thessaly Proper, lies a long narrow vale, through which winds the river Spercheius, and which, though generally considered as a part of Thessaly, is separated from it by the range of Othrys, and is very different from it in physical features. Homer mentions the Spercheius as belonging to the territory of Achilles round the Maliac Gulf. It is bounded on the south by the range of Œta, which runs from Pindus to the sea at Thermópylæ in a general direction nearly parallel to the Cambunian Mountains; and on its eastern side by the shores of the Bay of Malia, now the Gulf of Zeitoun.

According to Greek traditions, Thessaly was known in remote times by the names of Pyrrha, Æmonia, and Æolis. The two former names belong to the age of mythology; the last refers to the time when the country was inhabited by the Æolian Pelasgi, previous to the occupation of any part of it by the Thessalians, who, according to Herodotus (vii. 176; Strabo, ix. p. 444), originally came from Thesprotia, and settled in the country, which from them derived its future name. The name Thessaly does not occur in the poems of Homer, although the several principalities of which it was composed at the time of the Trojan war are enumerated, together with the different chiefs by whom they were governed. It is from Homer ('Iliad,' ii. 700) that we derive the earliest information about this part of Greece.

From very early times Thessaly was divided into four districts, or tetrarchies. These tetrarchies were, according to Strabo (ix., p. 430), Hestiæótis, Pelasgiótis, Thessaliótis, and Phthiótis: and the division, though it was a very ancient institution, existed in the Peloponnesian war (B.C. 404). These divisions contained each several large towns. In Hestiæótis there were—Gomphi (the wedges), a strong place on the Peneus; and Tricca, now Trikhala, about 12 miles S. of Gomphi. In Pelasgiótis were—Larissa, one of the most ancient and flourishing towns of Thessaly; Cynoscéphalæ, or Dogs'-Heads, where a victory was gained by the Romans over Philip of Macedon (B.C. 197); Pheræ, near the lake Boebeis, and Págasæ, its port. In Thessaliótis was Pharsálus, near which the battle was fought between C. Julius Cæsar and Cn. Pompeius. In Phthiótis were—Halos or Alos, on the west side of the Gulf of Págasæ; and Thebes, called Phthiotia, the most important town of this part of Thessaly.

The plains of Thessaly, with the exception of those of Bœotia, were amongst the most fertile and productive of Greece in wine, oil, and grain, but more especially in grain, of which Thessaly exported a considerable quantity. The Thessalians became very rich, and luxurious in their mode of life. Thessaly was also famous for its cavalry, the best in Greece: its plains supplied abundance of forage for horses.

The lands of Thessaly were not cultivated by the Thessalians themselves, but by a subject population, the Penestæ. The account given of them is, that they were the descendants of the Æolian Bœotians, who did not emigrate when their country was conquered by the Thessalians, but surrendered themselves to the conquerors on condition that they should remain in the country and cultivate the land for the new owners of the soil, paying, by way of rent, a portion of its produce. Many of them were richer than their lords. They sometimes accompanied their masters to battle, and fought on horseback as their knights or vassals. They formed a considerable portion of the population, and frequently attempted to emancipate themselves. As to the history of Thessaly, see the article 'Thessaly,' in the 'Penny Cyclopædia.'

THETFORD. [NORFOLK.]

THEU. [LIE'GE.]

THE'VENOT, MELCHISEDEC, is said by all his biographers to have died at the age of 71; and as his death happened in 1692, this places his birth in 1621. The earliest incidents of his life concerning which we have authentic accounts are those mentioned in the autobiographical sketch prefixed to the printed catologue of his library. He tells us that on his return from travelling in 1647, he was nominated resident at Genoa, but the troubles of the Fronde interfering to prevent his taking possession of the post, he continued to follow the court of France till 1652. He was then sent to Rome, where he continued nearly three years in an official capacity, and he attended Mazarin during the campaign in Flanders, 1655.

On his return to Paris, Thévenot devoted himself entirely to study. The meetings of scientific men which had been held in the houses of Père Mersenne and Montmort were transferred to Thévenot's mansion, but the expenses proving too heavy for his means, he proposed to Colbert the establishment of a permanent association of scientific men under the patronage of the king. The only part of the plan that was realised was the 'Académie des Sciences,' which commenced operations in June, 1666. Thévenot did not become a member of the Academy till 1685.

He had in the meantime however been diligently prosecuting his favourite studies. To render geography more perfect he published a collection of voyages—the first volume in 1662, and the fourth and last in 1672. In 1683 he published a small book in 12mo., entitled 'Recueil de Voyages de M. Thévenot.' It contains 'A Discourse on

the Art of Navigation, with some Problems which may supply in part the deficiencies of this useful art.'

After the death of Colbert in 1683, and the appointment of the young son of Louvois as royal librarian, the office of deputy-librarian was conferred upon Thévenot. On the death of Louvois he resigned or was dismissed from his office, in which there is reason to doubt whether he had given satisfaction. He died Oct. 29, 1692.

Thévenot commenced a series of observations on the variation of the magnetic needle in 1663, and prosecuted them with great perseverance till 1681. He suggested, in 1669, the measurement of several degrees of the meridian along the Gulf of Bothnia: he invented his air level about 1660. He possessed however rather the taste than the talent for strict scientific observation and reasoning. He was acquainted with many languages, European and Oriental, and his taste for collecting books has been the means of supplying the king's library at Paris with several valuable MSS.

THE'VENOT, JEAN, nephew of the preceding, was born at Paris, June 7, 1633. He left the college of Navarre, where he had distinguished himself, before he had completed his eighteenth year. Possessing an independent fortune he was enabled to gratify his taste for travel, and visited in succession England, Holland, Germany, and Italy. At Rome he made a prolonged stay (1654–55), and he there became acquainted with the celebrated Orientalist d'Herbelot. The result of their conversations was that Thévenot determined to devote himself to exploring Asia. He reached Constantinople Dec., 1655, and remained there till Aug., 1656. Travelling through Brusa and Smyrna, and visiting Chio, Samos, and Rhodes, he arrived at Alexandria Dec. 29. He proceeded to Cairo, which he made his head-quarters for two years. During his stay at Constantinople and Cairo, he made himself master of the Turkish and Arabic languages. On his way from Egypt he touched at Tunis and visited several parts of Italy before he returned to France. The first volume of his travels, he says, was prepared for the press to gratify his friends, and before the book had passed through the press he sailed from Marseille, Nov. 6, 1663.

This time his object was to visit Persia and the Indies. He arrived at Ispahan by way of Bagdad and Hamadan, and remained there five months. He left it, in company with Tavernier, and embarked at Basrah for Surat, where he arrived Jan. 12, 1666. Surat continued his head-quarters till Feb., 1667, during which time he made excursions to Guzerat, the court of the Mogul, and to the Deccan. On his return to Persia he spent five months at Ispahan. He had several attacks of illness in India, and his constitution was probably undermined; for, attacked by fever on his way from Ispahan to Tabriz, he died at Miana, Nov. 28, 1667. During this journey he had acquired a knowledge of the Persian language.

Thévenot had collected a Hortus Siccus in India, and had laid beside each specimen an account of the habitat and characteristics of the plant, along with its name in the Portuguese, Persian, Malabar, and (what is termed by the author of his biography in the second volume of his works) the Indian and Banian languages. He had also made a collection of Persian and Arabic manuscripts, of which Tavernier says the cadi of Miana kept the best to himself. His travels, originally published in 3 vols. 4to., which appeared respectively in 1665, 1674, and 1684, have been often reprinted, and translated into English, Dutch, and German.

THIA, Dr. Leach's name for a genus of crustaceans, placed by M. Milne Edwards under the tribe *Corystians*, in the family *Oxystomes*. *Thia* lives buried in the sand at a small distance from the shore. M. Milne Edwards states that but one species is known with any certainty, namely, *Thia polita*. Colour rosy; length ten lines; localities the British Channel and the Mediterranean.

THIAN SHAN NANLU is the name of a Chinese government situated nearly in the centre of Asia. European geographers generally call it Eastern or Chinese Turkistan, and also Little Bucharia. Thian Shan Nanlu lies between 36° and 44° N. lat., and extends from 71° to 96° E. long. It is mostly surrounded by countries belonging to the Chinese Empire. On the north, west, and south it is enclosed by mountain-ranges of such extent and elevation, that the places which are permanently inhabited can only be reached by passing for several days over mountains, which are not inhabited except for two or three months in the year, when they are visited by a few families of wandering tribes of mountaineers. On the east of Thian Shan Nanlu is an extensive desert, which appears to be uninhabitable. The country enclosed by the three ranges and the desert receives an abundant supply of water from the mountains, a considerable portion of which is always covered with snow, and the numerous rivers which descend from them form a large river, called the Tarim, which Ritter compares with the Danube, but which does not reach the sea; it terminates in an extensive lake situated on the western edge of the desert. The basin of the river Tarim is the largest closed river-basin on the globe, if that of the Caspian Sea and the rivers falling into it is excepted.

The Plain is of great extent, measuring on an average more than 300 miles from north to south, and about 900 from west to east. Its elevation is not known; but considering the peculiarities of its climate and its productions, it is presumed that it can hardly be less than 2000 feet above the sea-level. The largest portion of it is quite unfit for cultivation, and cannot even be used as pasture-ground. The remainder of the country is more fit for agriculture, but there are few really fertile districts.

The climate is distinguished by that dryness which is characteristic of all table-lands which are considerably elevated above the sea. Though abundant rains are experienced in the mountain-ranges which enclose the plain, and snow falls every winter to the depth of several feet, the quantity of snow and rain which descends on the

plain is very small. In the deserts no rain occurs. The heat in summer is very great all over the country.

It is remarkable that Thian Shan Nanlu, though without doubt considerably elevated above the sea-level, produces all the grains and fruits which are cultivated in the most southern parts of Europe, which are situated at the same distance from the equator, and are less elevated. Trees and shrubs are scarce. All the domestic animals of Europe abound with the exception of hogs, which are only kept by the few Chinese settled in the country. The other animals are chiefly the camel, yak, wild sheep, argali, jackal, tiger, wolf, lynx, and fox. Among the minerals are gold, copper, iron, sulphur, asbestos, saltpetre, and gems.

The bulk of the population is of Turkish origin. These Turks are at present divided into two tribes, which frequently make war on each other. Under the Chinese the management of the internal affairs is left in the hands of these chiefs. The other inhabitants are Chinese, Tadjicks, Olöth Calmucks, and two tribes of Kirghis.

Two great roads traverse the country, one from China to Western Asia, and one to India; and all the towns of which we have any account are situated on one or other of these two roads. *Hami*, or *Khamil*, as it is called by the natives, is a fortified place, being surrounded by high walls, which enclose a space about two miles and a half in circuit. The town is surrounded by large suburbs, where the caravans stop before they proceed for the west, and is populous. The streets are straight and regular, but the houses low and built of dried clay. *Pidshan* is a fortress which is nearly two miles in circuit, and near which the caravan road passes. *Karashar* is rather populous, and built on the banks of the Kaidu River, which is said to be navigable at this place. Its commerce is considerable. *Kutshe* is a large town three miles in circumference, and contains a large population, of which 6000 are Turks. *Aksu* is a large commercial and manufacturing town. Bucharian merchants from Tobolsk sometimes proceed as far as this place, and it is likewise visited by traders from Khokand, Tashkend, and Bokhara. Its manufactures are numerous, especially those of cotton-stuffs. Several articles made of leather, especially those of deer-leather, as harness and saddles, which are embossed with great art, are also highly valued, and exported to distant places. There are also some potteries, and many persons are employed in cutting and polishing precious stones. *Kashgar* stands at the junction of the two commercial routes, and is one of the most commercial towns in the interior of Asia. It is said to contain 15,000 houses, and a population of 80,000 individuals. In the middle of the town is a large square, from which four extensive bazars branch off. The Chinese garrison consists of 8000 men, who are stationed here to repress any invasion from the side of Khokand, and are quartered in a strong fortress, which is contiguous to the town. The manufactures are numerous and extensive: the largest are those of silk, in which several kinds of stuffs, as satin, damask, &c., are made, and some of them are interwoven with gold and silver thread. The manufactures of cottons are less important, but their colours are much praised.

Yarkiang, or *Yarkand*, may be considered the capital of Thian Shan Nanlu, as the Chinese military governor generally resides here. It consists of the city or fortress, which is surrounded by a high wall of stone, and is more than three miles in circumference, and a number of suburbs lie round it. The houses are mostly built of sun-dried bricks. There are numerous public buildings, especially mosques, medrasses, or colleges, bazars, and caravanserais. The country surrounding the town supplies it with silk, fine wool, and horses, of which last great numbers go to other places, and as far as China. The commerce with the countries north of Hindustan and with Thibet is very considerable. It is stated that there are several kinds of manufactures, but only cotton-stuffs are specified. The population is supposed to amount to about 200,000. There are other large towns, of which little is known.

The country of Thian Shan Nanlu has never in any way been connected with the political events of Europe and Western Asia, but frequently with those of China. Since the commencement of the Christian æra, the country has belonged successively to a Turkish race, to the Chinese, to a Tibetan race, to the Mongols, to the Chinese again, to some minor Turkish tribes, to the Tartars, to the Olöth Calmucks, to the Songarians, and lastly to the Chinese for a third time.

THIBAUT V., count of Champagne and first king of Navarre of that name, was born about the beginning of 1201. In 1221 he took upon himself the management of his domains, which rendered him the most powerful vassal of the crown. During the brief and troubled reign of Louis VIII., 1223–1226, Thibaut distinguished himself by nothing but the pertinacity with which he insisted upon his feudal rights. On the death of Louis VIII. a league was formed by a number of the most powerful French nobles to prevent Blanche the queen from acting as regent. Thibaut was at the outset a party to this confederacy, but soon abandoned it, which greatly incensed the Duke of Bretagne and his coadjutors, and they appear to have soon after formed the project of harassing him by supporting the claims of the Queen of Cyprus upon Champagne and Brie. Overtures of reconciliation however were made, in consequence of which Count Thibaut, who had been married twice before, engaged, in 1231, to take to wife the daughter of Pierre of Bretagne. But the match being prevented by the regent, the confederates determined to carry into execution their original project. They sent for the Queen of Cyprus, and invaded Champagne. Louis IX. marched to the assistance of Thibaut, and under his auspices a compromise was arranged.

In 1232 Thibaut married a daughter of Archambaud VIII. of Bourbon. In April, 1234, he succeeded to the throne of Navarre, on the death of Sancho the Strong.

In 1239 Thibaut took the cross, and set out at the head of an expedition to the Holy Land,

where, after a series of disasters, he got involved in the defiles of Mount Taurus, lost two-thirds of his men, and, at the final defeat near Ascalon, fled before the battle was ended, leaving his followers to their fate. He returned to Pampeluna, in 1242, and died in 1253.

The poems attributed to Thibaut are in number sixty-six, and there appears no reason for questioning the authenticity of any of them. The versification is correct and sweet; and they breathe a spirit of generosity which is creditable to himself.

THIBAUT, ANTON JUSTUS FRIEDRICH, was born on the 4th of January, 1772, at Hameln in Hanover. In 1792 he went to Göttingen to study the law; he continued his studies at Königsberg; and he finished them at Kiel. In this university he took the degree of D.C.L., and in 1796 was admitted as a junior teacher of law. He soon rose to eminence, and at the age of twenty-seven was appointed ordinary professor of civil law. In 1802 he went in the same capacity to Jena, where he published his 'System des Pandekten-Rechts,' the first systematical attempt of the kind that was written in the German language. In 1805 he was invited to the university of Heidelberg, where he remained till his death. Though scarcely past thirty, he was considered to be the first civilian in Germany after Hugo, Savigny having not yet attained his great reputation.

Thibaut died on the 28th of March, 1840, with the well-deserved reputation of being equal to Savigny as a civilian, and superior to him as a teacher and a practical jurist. The great object of Thibaut was to distinguish clearly between the obsolete portions of the Roman law, and those which were of real practical use. In his private life Thibaut was most amiable; to many a poor student he proved a kind father; to many who had talent, a wise friend. His house was open to all his pupils, whether introduced to him by others or by themselves; but he showed particular attention to those who, besides their legal knowledge, showed proficiency in music, of which he was a profound judge.

The principal work of Thibaut is his 'System des Pandekten-Rechts,' mentioned above, of which the eighth edition was published at Heidelberg in 1834, 2 vols. 8vo., and a ninth edition since the author's death, by Professor Buchholtz, Jena, 1846. A list of the other works of Thibaut is given in the 'Penny Cyclopædia.'

THIBET. [Tibet.]

THIEL. [Guelderland.]

THIELEN, JAN PHILIP VAN, was born at Mechlin in 1618. Though of a noble family, and lord of Couwenburg, he adopted painting as a profession. His subjects were usually in the taste of Segers, garlands of flowers, with some historical design in the centre, or festoons around vases enriched with representations in bas-relief. He was much employed by Philip IV., king of Spain, and most of his finest performances are (or were) in the Spanish royal collection.

THIELT. [Flanders, West.]

THIERS. [Puy-de-Dôme.]

THIMBLE. Thimbles are usually formed by means of a stamping machine; but the following method is sometimes practised in France:—Sheet-iron, one twenty-fourth part of an inch thick, after being cut into strips of convenient size, is passed under a punch-press, by which it is cut into circular discs of about two inches diameter. These discs are then made red-hot, and laid in succession upon a series of mandrils, with hollows of successively increasing depth, into which the softened discs are forced by striking them with a round-faced punch, about the size of the finger. After being thus brought to the required shape, the thimble is placed in a lathe, when the inside is polished and the outside is turned and ornamentally finished. Iron rings used in the rigging of ships are in some instances called thimbles.

THIONURIC ACID is a white semi-crystalline mass, readily soluble in water, and the solution reddens litmus strongly. When heated it is decomposed, much sulphuric acid remains in solution, and a crystalline compound is formed, which is termed *Uramil*.

Thionuric acid (which consists of H^7 C^8 O^{14} N^3 S^2) combines with bases to form salts, which are termed *Thionurates;* they are not however of sufficient importance to require description.

THIONVILLE. [Moselle.]

THIRD, an interval in music. The ratio of the Major Third is 5 : 4; of the Minor Third, 6 : 5. The former comprises one major and one minor tone, as C E. The latter comprises a major tone and a semitone, as A C.

THIRSK. [Yorkshire.]

THIRST is the peculiar sensation which excites the desire to drink.

The times and degrees in which thirst is felt during health are, in general, such that by satisfying it the body is provided with the quantity of water necessary for the repair of its tissues and the maintenance of their proper moisture, and for the replacement of the fluid which is constantly lost by perspiration and other discharges. The quantity of water necessary for this purpose varies greatly, according to the different circumstances of age, sex, and temperament, and still more according to the nature of the food taken, the state of the atmosphere, the mode of life, and the custom of the individual.

As a general rule, the degree of thirst during health is directly proportioned to the rapidity of the exhalation of fluid from the skin and lungs. Hence the naturally greater thirst in summer, and the desire for the fresh fruits of the season, which both supply water and produce moisture of the mouth by exciting a flow of saliva; hence also the less natural thirst which is produced by remaining in hot and crowded rooms, and that which is so painfully felt by those who work about iron-forges and steam-engines, and which they can satisfy only by frequent and enormous draughts of water. Of the same kind is the thirst which many have felt in ascending high mountains, on which, as the atmospheric pressure diminishes, the evaporation from the skin is increased; and that which is produced by exposure to a dry brisk wind.

THIRTY TYRANTS (*of Athens*). Theramenes; Thrasybulus.]

THIRTY TYRANTS (*under the Roman Em-*

pire). This name has been given to a set of usurpers who sprung up in various parts of the Roman Empire in the reigns of Valerian (A.D. 253–260) and Gallienus (261–268). They rose in different parts, assuming the title of emperor, in regular succession, and were put down one after another. Their number does not amount to thirty, unless women and children, who were honoured with the imperial title, are included. Trebellius Pollio, who, in his work on the 'Triginta Tyranni,' describes the adventures of each of them, has taken great pains to make out that their number was thirty. There were however only nineteen real usurpers:—Cyriades, Macrianus, Balista, Odenathus, and Zenobia, in the eastern provinces; Posthumus, Lollianus, Victorinus and his mother Victoria, Marius, and Tetricus, in Gaul, Britain, and the western provinces in general; Ingenuus, Regillianus, and Bureolus, in Illyricum and the countries about the Danube; Saturnius, in Pontus; Trebellianus, in Isauria; Piso, in Thessaly; Valens, in Achaia; Æmilianus, in Egypt; and Celsus, in Africa. The majority of these usurpers were persons of low birth, without any talent or virtue, and scarcely any one of them died a natural death. The best among them were Piso and Odenathus, and the latter, who maintained himself at Palmyra, received the title of Augustus from the Roman senate, and was enabled to bequeath his empire to his widow, the celebrated Zenobia. (Gibbon, 'Hist. of the Decline and Fall,' chap. x.)

THIRTY YEARS' WAR is the name of that memorable contest which lasted from 1618 to 1648, between the Emperor and the Roman Catholic states of Germany on one side, and the Protestant states, with their allies, Denmark, and afterwards Sweden and France, on the other side. Spain, Holland, and Transylvania, also took part in it, but their interference was less direct. This long struggle has generally been considered a religious war, but political objects were the real motives of the contending parties, and religion was used to veil the designs of the leaders.

Towards the end of the 16th century the Roman Catholic party recovered the political influence which it had been losing since the treaty of Passau (1552), and in May, 1608, the 'Protestant Union' was established, for the purpose of resisting the claims of the Roman Catholic states, which demanded the restitution of all the territories, &c., which had been seized by the Protestants since the treaty of Passau. The Elector Palatine Frederick IV., a Calvinist, was the leader of the Union, which consisted chiefly of Calvinists. The members of the Union immediately levied troops, and sent ambassadors to England, France, and Venice.

The formation of the Roman Catholic Union, called the 'Liga,' took place in 1609, and the confusion caused by the religious contentions which followed became still greater by the interference of the King of Spain, Philip III., who ordered his general, Spinola, to occupy the duchies of Cleves and Jülich for the Count Palatine with a body of 30,000 Spaniards. But no sooner had his army entered these territories than the United States of the Netherlands, then at war with Spain, sent troops into the same countries under the pretence of occupying them for the Elector of Brandenburg (1614). The Empire was now on the eve of a general war. Rudolph II. was succeeded by Matthias on the imperial throne (1612). The number of Lutherans and Calvinists having greatly increased in Bohemia, they claimed an extension of their religious liberties. Matthias sent commissioners to Prague, who assembled the deputies of the Bohemian states, and communicated the Emperor's refusal. Suddenly an armed party of Bohemian nobles rushed into the room, and seized two of the commissioners, who with their secretary were precipitated from the windows; but they all escaped, and hastened back to Vienna.

This happened May 21, 1618, and this day is regarded as the beginning of the Thirty Years' War. The insurgents immediately levied an army and organised a regular administration of the kingdom. The Emperor Matthias died soon afterwards (March 20, 1619), and Ferdinand II., archduke of Austrian Styria, succeeded him as Emperor. Although Ferdinand promised religious liberty to the Protestants of Bohemia, they nevertheless declared the throne vacant. Frederick V., elector palatine, the son-in-law of James I. of England, was chosen king of Bohemia, and was crowned at Prague, Nov. 4, 1619.

Ferdinand II., assisted by his allies, took vigorous though arbitrary measures to recover Bohemia and her dependencies. In the autumn of 1620 the Lower Palatinate was occupied by the Spaniards under Spinola; the Duke of Bavaria overran the Upper Palatinate, and entered Bohemia; John George, elector of Saxony, conquered Lusatia; and Austria was occupied by the Emperor himself. At last the Bavarians, commanded by their Duke and the celebrated Tilly, forced the Bohemians to make a stand on the Weisse Berg under the walls of Prague. There the Bohemians were completely defeated, Nov. 8, 1620. Frederick fled from his capital, and took refuge in Holland. Towards the close of 1621 Bohemia, with all her dependencies, was in the hands of the Emperor, who punished the Bohemians severely. The Lutheran and Calvinist ministers were banished, and their churches were shut up. The Roman Catholics were restored to all their rights; and the university of Prague and the whole national education were put under the direction of the Jesuits. The Emperor then put King Frederick under the ban of the Empire, and declared his electorship to be forfeited.

Before the fate of Bohemia was decided, Christian IV., king of Denmark and duke of Holstein, several princes of northern Germany, and the ambassadors of England, Sweden, and the United States of the Netherlands, held a congress at Segeberg in Holstein for the purpose of forming an alliance against any ambitious schemes of the Emperor. The events which followed placed the Emperor in a very embarrassed situation. In 1625 the war in northern Germany was carried on by the troops of the Liga, and principally by those of Bavaria, which were commanded by Tilly, who was at the same time commander-in-chief of the forces of the Union. On the other side, Ferdinand was threatened by the Count of Mansfeld,

who was then at the head of a strong army in the duchies of Mecklenburg, and who was ready to invade Lusatia and Silesia, and to join Betlen Gabor, prince of Transylvania.

Albrecht of Waldstein [WALLENSTEIN] saved the Emperor. He defeated Mansfeld in several battles, and compelled Gabor to submit to the Emperor. While Waldstein was victorious in eastern Germany, Tilly carried on the war successfully in the country west of the Elbe against the King of Denmark. In 1628 he was joined by Waldstein, and the campaign of the following year terminated in the treaty of Lübeck, May 22, 1629, when Waldstein made a treaty with the King of Denmark, on conditions unexpectedly favourable. Meantime, encouraged by the success of his armies, and misled by imprudent counsellors, Ferdinand II., March 6, 1629, issued the 'Edictum Restitutionis.' By this edict he deprived the Calvinists of their religious liberties; and he declared that all bishoprics, abbeys, and churches taken from the Roman Catholics should be restored to them. This edict however met with so much opposition that it was agreed to make its legal execution dependent upon the arbitration of a general meeting of all the states. This meeting was fixed for the month of February, 1631.

Meantime Gustavus Adolphus, king of Sweden, prepared to take up arms as the champion of Protestantism. French subsidies enabled him to be ready for the new war in the spring of 1630. He gradually occupied all Pomerania, and on Jan. 13, 1631, concluded a treaty with France, by which he engaged himself to carry on the war against Austria with 16,000 cavalry and 30,000 foot, on the condition of an annual subsidy of 400,000 thalers. A sketch of the remainder of his triumphant career will be found under GUSTAVUS ADOLPHUS.

The death of their king did not lessen the power of the Swedes, nor change their politics: the chancellor Oxenstierna directed their affairs with the same views, and the new generalissimo, Bernhard of Saxe-Weimar, was one of the most distinguished captains of his time. In 1633 Oxenstierna concluded an alliance with the states of the circles of Suabia, of Franconia, of the Upper Rhine, and of the Lower Rhine, and Duke Bernhard got possession of Regensburg. After the assassination of Waldstein, Feb. 25, 1634, Ferdinand of Austria, the son and heir of the Emperor, succeeded as commander-in-chief of the Imperial and Bavarian armies: his lieutenants were Gallas and John von Werth, both experienced generals. Reinforced by a corps of Spaniards, he attacked the Swedes at Nördlingen, Sept. 7, 1634. The Swedes were routed, their general, Horn, was made prisoner, and southern Germany fell into the hands of the Imperialists. Although France still continued in friendly alliance with Sweden, the Protestant princes now began to lose either hope or interest in the cause. Saxony concluded peace with the Emperor, May 30, 1635, at Prague; and Brandenburg gave in its adherence to this peace Aug. 27. The Landgrave of Hesse Darmstadt, the Dukes of Mecklenburg, of Brunswick, and of Saxe-Weimar (Duke William), the cities of Frankfort, of Erfurt, &c., the Hanse Towns, and at last the whole circle of Lower Saxony, became parties to the peace of Prague in the course of the same year. Among all the Protestant states of importance, Hesse-Cassel, Würtemburg, and Baden, were the only states which continued their alliance with Sweden.

The most important event from 1635 to 1639 was the conquest of Alsace by Duke Bernhard of Saxe-Weimar, who hoped to possess that Austrian province as an hereditary duchy. His plans however were contrary to the policy of France, and no sooner had the Duke's intentions become manifest, than he fell suddenly ill, and died July 8, 1639. His army was bought by France, who immediately occupied Alsace. Previously to this the Emperor Ferdinand II. died (Feb. 15, 1637), and was succeeded by his son Ferdinand III., who had been king of the Romans since 1636. Leopold William, the brother of Ferdinand III., was appointed generalissimo of the Imperial army; and as early as the spring of 1640 he succeeded in driving the Swedes, under Banér, from Bohemia. Banér, reinforced by a French corps, was defeated by the Imperialists, and on his retreat lost half of his troops. Banér died in May, 1641, and his successor was Torstenson.

Torstenson conquered, or rather traversed, in the spring of 1642, Saxony, Silesia, and Moravia, and his light horse appeared in the neighbourhood of Vienna. At the same time the French general, Marshal de Guébriand, penetrated into Suabia. The Imperial generals however saved the hereditary states of Ferdinand; and while Torstenson retired to the north, where his presence became urgent on account of a war with Denmark, the French army was compelled to cross the Rhine. Guébriand was killed in an engagement near Rotweil, and his successor, the Count of Rantzau, was defeated by the Imperialists, Nov. 24, 1643, near Duttlingen, the French army being almost annihilated. Meantime, while Christian IV. of Denmark was fighting with Torstenson in Jutland, Gallas, the general of the Emperor, suddenly appeared in Holstein, with the view of placing the Swedes between two fires. From this dangerous position Torstenson escaped, and Gallas brought only half his army back to Austria. In the meantime France had levied a new army, which was put under the command of Turenne, and reinforced by a body under Louis d'Enghien, afterwards Prince of Condé. They defeated the Imperialists under Mercy, and at last obliged them to retire to the east of the Black Forest, leaving the Palatinate, Alsace, and Baden in the hands of the French (autumn, 1644). The Imperialists were still more unfortunate in eastern Germany. Torstenson defeated them and the Saxons at Jankau in a bloody battle (March, 1645), and carried all before him. The Elector of Saxony and the Elector of Brandenburg now renounced their alliance with the Emperor, and made their peace with Sweden; and their example was followed by the Elector of Bavaria. This was followed by a victory of the Swedes at Susmarshausen, near Augsburg (May 7, 1648). Königsmark, their general, invaded Bohemia, and on July 31 con-

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quered that separate part of Prague which is called the Kleinseite. This conquest was the last important event of the Thirty Years' War, which began and ended at Prague.

On the 14-24th of October, 1648, a double peace, which had been several years in negociation, was concluded at Münster and at Osnabrück, under the name of the Peace of Westphalia. The principal conditions of the peace, after settling the cession of certain territories and rights to foreign powers, and to members of the Empire, were:— 1, the Treaty of Passau and the Second Peace of Religion were confirmed; 2, the religious quality of a territory or state was to be decided after the status quo of the 1st of January, 1624 (N.S.); 3, equality of political rights between the Roman Catholics, the Lutherans, and the Calvinists or Reformed; 4, the Jus Reformandi was reduced to its original meaning as a mere protection of religion; 5, the ecclesiastical jurisdiction of the bishops was conferred upon the Protestant princes as a right of sovereignty, but in the Roman Catholic territories it remained in the hands of the bishops; 6, the princes acquired the right of concluding separate defensive and offensive alliances with foreign states; 7, the German Empire was changed into a kind of confederacy of almost sovereign states, the Emperor becoming a mere director of the public affairs; 8, the Peace of Westphalia was guaranteed by Sweden and France.

THISTLE, the common name of *Carduus*, a genus of plants belongimg to the large natural order *Compositæ*. The genus *Carduus*, Common Thistle, consists of upwards of 30 species, most of which are inhabitants of Europe. None of them are found in the New World. *C. nutans*, Musk-Thistle, is a common plant on waste ground, in dry, stony, or chalky soils, in Great Britain. It gives out, especially in the evening in warm weather a strong smell of musk. *C. marianus*, Milk-Thistle, is a native of England; scarce in Scotland. The leaves are distinguished by the milky whiteness of their veins. This plant is an esculent, and may be eaten young as a salad, or boiled and eaten as greens. The young stalks, when peeled and soaked in water, are also excellent. The root may be prepared like salsify and skirret, and the receptacle may be cooked and eaten as the artichoke. The genus *Cnicus*, Plume-Thistle, is known by the feathered down that crowns the seeds. It is a large genus: nine of the species are inhabitants of Great Britain. The Cotton-Thistle is the *Onopordon*, which is known by its honeycombed receptacle. The receptacle and stalks of the Cotton-Thistle are sometimes eaten, in the same manner as the artichoke and cardoon. The Carline Thistle forms the genus *Carlina*, which obtained that name from a tradition that the root of the Common Carline (*C. vulgaris*) was shown by an angel to Charlemagne as a remedy for the plague which prevailed in his army. The Blessed Thistle is the *Centaurea benedicta*, the *Carduus benedictus* of old writers. It is a native of the Levant, and in the middle ages was held in extravagant estimation on account of its supposed virtues. It is still cultivated in some places on account of its medical properties.

For Sow Thistle, see SONCHUS.

Some of the species of thistles are admitted into gardens. They form a pretty variety for borders, and require little care in their cultivation.

THISTLE, ORDER OF THE, an ancient Scottish order of knighthood, sometimes called the order of St. Andrew. The early history of this order is involved in some obscurity, but the warrant of James II. in 1687 for the re-institution of the 'most ancient and honourable Order of the Thistle,' which is printed at full by Sir Harris Nicolas, in his 'History of the Orders of Knighthood,' asserts that by authentic proofs, documents, and records, the order 'continued in great glory and splendour for many hundreds of years.' Owing to the abdication of James, the order again fell into abeyance until it was revived by Anne in 1703. In the warrant of 1687 it is stated that the order consisted originally of the king and twelve brethren (in allusion to the Saviour and the twelve apostles), and the same number was ordained as the full complement by Anne. In May, 1827, the number of knights brethren was permanently extended to sixteen. Originally none but Scottish noblemen were admitted to the order; but since the time of George I. it has been conferred upon several English peers. No foreigners have been admitted to the order; nor have any commoners, excepting a few who were heirs-apparent to dukedoms. The principal decorations worn by the knights consist of a collar of enamelled gold, composed of sixteen thistles, interlaced with sprigs of rue, and a medal or badge of gold, having an image of St. Andrew within a circle containing the motto of the order, '*Nemo me impune lacessit*' (No one provokes me with impunity). The officers of the order are the dean, the secretary, the king-at-arms, and the usher, each of whom receives a salary, and a fee on the election of a knight.

THLASPI, a genus of plants belonging to the natural order *Cruciferæ*, and the suborder *Angustiseptæ*. *T. arvense*, Penny Cress, is native throughout Europe and in England. The flowers are small and white, and the whole plant when bruised has a somewhat alliaceous odour. *T. perfoliatum* is a native of Europe and is found in England on a chalky soil. *T. alpestre* is found on mountain limestone pastures throughout Europe and England.

THLASPI'DEÆ, a tribe of plants of the natural order *Cruciferæ*, having for its type the genus *Thlaspi*. The principal genera of this tribe are, *Thlaspi*, the Bastard Cress; *Iberis*, the Candy-Tuft; *Hutchinsia;* and *Biscutella*, the Buckler-Mustard. They are most of them insignificant plants, possessing the acrid biting properties of the whole order. *Hutchinsia* was named by Sir J. E. Smith after Miss Hutchins of Belfast, who contributed many observations on marine plants to the 'English Botany.' All the species are mountainous plants. They possess no active properties, but are pretty little plants. The Candy-Tuft is known by two of its petals being larger than the other two; they are of a white or purplish colour, but never yellow. They are mostly mountainous plants, but grow well in gardens.

THOMAS, one of the twelve apostles of Christ. St. Thomas is presumed to have been a Galilean; but no particulars of his birth-place or call to the apostleship are given, and the first notice of him individually is in John, xi. 40. The incredulity of Thomas, and his ultimate faith, by which he is principally known, are narrated in John, xx. 24–29. Thomas is not again mentioned in the New Testament.

THOMAS, ST. (Santo Thomé), an island in the Gulf of Guinea, extends from 1′ to 25′ N. lat., and from 6° 25′ to 6° 43′ E. long. It is about 140 miles W.N.W. from Cape Lopez. The island is of an oval shape; its greatest length is about 30 miles, and its greatest breadth 18. It is of basaltic formation, and mountainous: the Pico de Santa Anna de Chaves is 7000 feet high. The mountains are mostly covered with wood, and there are numerous streams well supplied with fish. The vegetation is abundant. The chief exports are sugar, indigo, and cotton. The island belongs to the Portuguese; and the inhabitants, who are chiefly composed of Portuguese and of negro slaves, amount to about 18,000. The chief town is called Santo Thomé.

THOMA'SIUS, CHRISTIAN. The real name of this author is Thomas. He was born at Leipzig, Jan. 12, 1655, and was the son of Jacob Thomas (1622–1684), a professor of philosophy, from whom he received his preparatory education. Christian entered the university in his 14th year, and in his 16th he obtained the degree of B.A., and the year after that of M.A. In 1675 he went to Frankfort-on-the-Oder, where, after having obtained the degree of LL.D., he commenced legal practice. But this occupation did not offer sufficient scope for him, and he again became an academical teacher, in which capacity he brought about many beneficial reforms.

In 1687 Thomasius published his programme in German, instead of the orthodox Latin, and announced that he would deliver a course of lectures in the same language. This daring innovation, though at first regarded as a perfect heresy, was gradually followed by other professors, until it became the universal practice in all German universities. In 1688 he established a German Monthly Review, which he conducted from 1688 till 1690, and which gave him great influence in all parts of Germany. But his enemies were soon at work on every side; he was charged with atheism; his Journal was burnt in the market-place at Copenhagen; and the divines of Wittenberg eventually induced the chief consistory to issue an order for his apprehension. He now fled to Berlin, where he met with a kind reception from Frederick III., elector of Brandenburg (afterwards King Frederick I.), who permitted him to settle at Halle, and to lecture in the Ritter-Akademie (academy for young noblemen) of that place. The increase in the number of students induced the elector in 1694 to found the university of Halle, in which he appointed Thomasius professor of jurisprudence, and conferred upon him the title of councillor. He refused an invitation to the chair of jurisprudence in the university of Leipzig, and was rewarded by King Frederick with the title of privy-councillor. In 1710 Thomasius was elected rector of the university of Halle, and dean of the faculty of jurisprudence. He died Sept. 23, 1728.

Thomasius not only destroyed old prejudices and pedantry in places of learning, but he boldly combated superstition and hypocrisy in the affairs of common life; and it is chiefly owing to his exertions that torture and trials for witchcraft were abolished in Germany. Among his numerous writings, one on Logic, published at Halle in 1691, was the first readable book upon the subject ever published in Germany; and another contained a better system of Ethics than had previously appeared in that country (Halle, 1692).

THOMASTOWN. [KILKENNY.]

THOMSON, JAMES, was born at Ednam in Roxburghshire, Sept. 11, 1700, of which place his father was minister. James was first sent to the grammar-school at Jedburgh, and completed his education at the University of Edinburgh, where in 1719 he was admitted as a student of divinity. But Thomson's taste was decidedly towards poetry, and he therefore determined to give up divinity, and try his fortune in London. Arrived there, his first misfortune was to lose his letters of recommendation; a pair of shoes was his first want; and his manuscript of 'Winter' his only property. With some difficulty Mr. Millar was induced to give a trifle for the poem, and it was published in 1726.

Its success—which however was not immediate—procured him many friends, among whom was Dr. Rundle, who introduced him to the Lord Chancellor Talbot; and some years after, when the eldest son of that nobleman made a tour on the Continent, Thomson was appointed his travelling companion. Meanwhile in 1727 appeared his 'Summer;' in 1728, his 'Spring;' and in 1730, his 'Autumn.' Besides these he published, in 1727, 'A Poem sacred to the Memory of Sir Isaac Newton,' and 'Britannia,' a poetical invective against the ministry for the indifference they showed to the depredations of the Spaniards in America. The tragedy of 'Sophonisba' was acted in 1727, but met with very equivocal success. His poem of 'Liberty,' upon which he employed two years, followed; but it has been the least read of all his works.

His friend Talbot appointed him secretary of briefs, a place requiring little attendance, and equal to all his wants. When his patron died, Lord Hardwicke kept the office vacant for some time, but Thomson did not ask for it, and it was given to some one else. This reverse of fortune increased his literary activity. In 1738, besides editing his own works in two volumes and writing a preface to Milton's 'Areopagitica,' he produced the tragedy of 'Agamemnon,' for which he got a considerable sum, though it had but poor success. Thomson's next tragedy was 'Edward and Eleonora,' which was not allowed to be represented on account of certain pretended political allusions. He then wrote, conjointly with Mallet, the masque of 'Alfred,' which was represented before the Prince and Princess of Wales at Clifden in 1740.

Thomson's next work was another tragedy, 'Tancred and Sigismunda,' which had more success. His friend Sir George Lyttelton now appointed him surveyor-general of the Leeward Islands, from which, after paying a deputy, he received about 300*l.* a year.

The 'Castle of Indolence,' which was many years under his hands, was finished and published in 1748. It was at first little more than a few detached stanzas, in the way of raillery on himself and some of his friends. But the subject grew under his hands till it became his masterpiece.

He died Aug. 27, 1748, in consequence of a neglected cold. He left behind him a tragedy of 'Coriolanus,' which was brought on the stage, and produced a considerable sum, which paid his debts and relieved his sisters in Scotland.

THOMSONITE, a colourless, translucent, hard, brittle, crystallisable mineral, which becomes opaque before the blowpipe. It consists chiefly of silica, alumina, lime, and water.

THORA'CIC DUCT is the principal trunk of the lymphatic or absorbent system, and the canal through which the greater part of the chyle and lymph is conveyed into the blood. [ABSORBENTS; CHYLE; DIGESTION.]

THORAX. [RESPIRATION.]

THORN. [CRATÆGUS.]

THORN. [MARIENWERDER.]

THORNBURY. [GLOUCESTERSHIRE.]

THORNE. [YORKSHIRE.]

THORNHILL, SIR JAMES, was born at Weymouth in 1676, and was descended from an ancient family in Dorsetshire, but through the extravagance of his father was compelled to support himself by his own exertions. He adopted the profession of a painter, and appears to have made rapid progress in the public favour, for in his fortieth year, when he made a continental tour, he was sufficiently wealthy to purchase many valuable pictures. Upon his return he received the commission from Queen Anne to paint the interior of the cupola of St. Paul's Cathedral, and afterwards to paint the princess's apartment at Hampton Court. Sir James executed many other large works, as the staircase, the gallery, and several ceilings in the palace at Kensington, a hall at Blenheim, and (with some assistance) the great hall at Greenwich Hospital.

Walpole has preserved some interesting details respecting the remuneration Thornhill received for some of his works, which seems to have been very scanty, as, for instance, 40*s.* a square yard for the cupola of St. Paul's.

Thornhill painted also several portraits and some altar-pieces. In 1724 he opened an academy for drawing at his house in Covent Garden. He had previously proposed the foundation of a Royal Academy of the Arts, with apartments for professors, but without result. Being afflicted with gout he retired to his paternal seat at Thornhill, near Weymouth, which he had the satisfaction of repurchasing; and here, four days after his arrival, he expired in his chair, May 4, 1734. He left a son, whom he had got appointed serjeant-painter and painter to the navy; and one daughter, who was married to Hogarth.

Sir James Thornhill amassed considerable property, was a Fellow of the Royal Society, and represented Weymouth in parliament for several years until his death. He was knighted by George I.

THORNTON, BONNELL, was born in London, in 1724. He was educated at Westminster School, and at Christchurch, Oxford. In compliance with the wish of his father, who was a physician, he studied medicine, but he left that profession for literature. In conjunction with George Colman the Elder, his early friend and schoolfellow, he commenced the series of periodical essays called 'The Connoisseur,' which was continued from Jan. 31, 1754, till Sept. 30, 1756. Thornton contributed largely to 'The St. James's Magazine,' 'The Public Advertiser,' 'The Covent-Garden Journal,' and other periodical works. He published separately a burlesque 'Ode on St. Cecilia's Day,' 1762, 4to. In 1767, in conjunction with Colman and Richard Warner, he published two volumes of an English translation in blank verse of the Comedies of Plautus; and in 1768 'The Battle of the Wigs, an additional Canto to Dr. Garth's Poem of The Dispensary,' London, 4to.

Thornton, who appears to have injured his constitution by habitual indulgence in drinking, died May 9, 1768.

THORESBY, RALPH (born 1658, died 1725), was the son of a merchant at Leeds, to whose business he succeeded. He had a liberal commercial education, having been sent by his father to Holland for the purpose of becoming acquainted with the mode of conducting business in that country, and of acquiring the modern languages. He inherited some of the tastes of his father, who had purchased the collection of coins and medals which had been formed by the family of Lord Fairfax, the parliamentary general, and he made this collection the basis of a valuable museum. As he advanced in life his curiosity became expanded so as to comprehend the whole range of antiquarian literature. In the department of natural history he was also not merely a collector, but an observer, and he made many communications not only to his private friends, but to the Royal Society, of which he was a Fellow.

Having retired from business upon a small income, he entered upon the preparation for the press of two works, one a topographical survey of the whole of the large parish of Leeds; the other, a history of the various transactions of which that district had been the scene, biographies of its more eminent inhabitants, &c. The first of these designs only was accomplished. The work appeared in a folio volume in 1715, under the title of 'Ducatus Leodiensis, or the Topography of the Town and Parish of Leeds,' a valuable work, containing more information than its title promises.

As a kind of supplement to this work he published, in 1724, a history of the church of Leeds, under the title 'Vicaria Leodiensis,' which has also many things not strictly belonging to his subject, but in themselves valuable. Large extracts from Thoresby's Diary were published in two octavo volumes, in 1830, and two more volumes of selections from the letters of his various friends.

THOROUGH-BASE, the art of playing (on

keyed instruments, and according to the rules of harmony) an accompaniment from figures representing chords, such figures being placed either over or under the notes of the instrumental base staff. This is one of the many absurd terms employed in music, and its meaning is altogether arbitrary.

The figures used in *Thorough-Base* are the nine units. These represent certain intervals or sounds. Thus a 6 placed over a C in the base, points out A as an accompaniment: and that figure also implies two other notes attendant on it, namely, the 3rd and 8th, which are called the *accompaniments* of the 6th. A 6 and a 5 placed under it $\binom{6}{5}$ indicate the intervals of the 6th and 5th played together; and also, as accompanying notes, the 3rd and 8th. The figures 3, 5, and 8, singly, or together, represent the perfect or common chord. But in *Thorough-Base* a base note without any figure is supposed to carry a perfect chord. The chords are, as a general rule, assigned to the right hand of the performer, and the intervals are, in most cases, counted from an octave above the figured note.

The practice of figuring a base staff, whether in a score or in the part assigned to a keyed instrument, has fallen into disuse, the harmony being now fully and clearly presented to the eye of the accompanyist in notes placed in a treble staff over the base. But a knowledge of what is yet too commonly misnamed *Thorough-Base*, that is to say, harmony, is absolutely indispensable to the good musician, and very much abbreviates the labour of those who, as amateurs, only aspire to a practical skill either as vocal or instrumental performers.

THORWALDSEN, BERTEL (*Albert*), was born Nov. 19, 1770, at Copenhagen. He was the son of Gottschalk Thorwaldsen, a poor woodcarver of Iceland. Bertel assisted his father in his work at a very early age, and when only eleven years old he attended the free school of the Academy of Arts at Copenhagen. At the age of seventeen he obtained the silver medal of the academy, for a bas-relief of Cupid reposing; and in 1791, when he was only twenty years of age, the small gold medal for a sketch of Heliodórus driven from the temple. Two years later he obtained the principal gold medal of the Academy, and with it the privilege of studying for three years abroad at the government expense. After some preliminary study, and various delays on the journey, he arrived at Rome, March 8, 1797. Thorwaldsen brought letters of introduction to his distinguished countryman Zoëga, who however did not give him much encouragement; but a statue of Jason with the Golden Fleece, which Thorwaldsen executed at Rome, obtained the hearty commendation of Canova. By the assistance of a Danish lady, Frederika Brun, the statue was cast in plaster, and Thorwaldsen prepared for his return home; but when about to step into the vehicle of the vetturino, one of his companions, the Prussian sculptor Hagemann, found that his passport was not in order, and one delay being followed by another, it eventually happened that Thorwaldsen did not return to his native country until 1819, after an absence of twenty-three years. The liberality of Thomas Hope, who gave 800 ducats for a marble copy of the Jason, was the immediate cause of Thorwaldsen's finally settling in Rome.

From this time the star of Thorwaldsen was in the ascendant, and commissions crowded in from all sides. Among the principal works which he executed at Rome was his celebrated bas-relief of the Triumph of Alexander for the Quirinal Palace, the plaster frieze of which was executed for the occasion of Napoleon's visit to Rome in 1812.

In July, 1819, Thorwaldsen started in the company of two friends on his first visit to his native land, and he arrived at Copenhagen Oct. 3 of the same year: his parents had died some years before. His fame was now so well established, that even through Italy and Germany his journey was a triumphal progress, and at its termination he was lodged in the palace of Charlottenburg, and entertained with public feasts. In about a year he left Copenhagen and returned to Rome through Berlin, Dresden, and Warsaw, where he received several commissions, and made a bust of the Emperor Alexander.

He executed his principal works after his return to Rome,—as Christ and the Twelve Apostles; the group of St. John in the Wilderness; and the monuments to Copernicus, Pius VII., Maximilian of Bavaria, the Poniatowski monument, and others. In 1838 the Christ, the St. John preaching, and the Apostles,—the principal works for the cathedral or church of Our Lady at Copenhagen—and other works for the palace of Christiansburg, were completed, and the Danish government sent the frigate Rota to carry them and their sculptor to Copenhagen. He intended to return to Rome in the summer of 1844, the climate of the north being prejudicial to his health, but he died suddenly in the theatre of Copenhagen, March 24, 1844. He lay in state in the Academy, and was buried with extraordinary ceremony in the cathedral church of Copenhagen.

Thorwaldsen is considered by his admirers the greatest of modern sculptors, and many have not hesitated to place him far above Canova, and to compare him with the antique. This is however hardly the rank he will hold with posterity. His style is uniform to monotony, though many individual figures are bold, solid, and of beautiful proportions. In the library of Trinity College, Cambridge, is a statue of Lord Byron by Thorwaldsen. It is of the size of life. It was intended to be placed in Westminster Abbey, but permission to set it up was refused by two successive deans, and it was therefore taken to Cambridge.

THOU, JACQUES-AUGUSTE DE (or, as he called himself in Latin, Jacobus Augustus Thuanus), was born at Paris, Oct. 8, 1553: he was the third son of Christophe de Thou, first president of the parlement de Paris. His extreme delicacy of constitution procuring him exemption in his youth from severer task-work, he amused himself in cultivating a turn for drawing, and in this way, he tells us, he learned to write before

he had learned to read. Although intended for the church, he went the whole round of literature and science as then taught; and while only in his eighteenth year he had conceived so great an admiration of the celebrated jurist Cujacius, that he proceeded to Valence in Dauphiné, and attended his lectures on Papinian. Here he met with Joseph Scaliger, with whom he contracted a friendship as intimate as it was lasting. In 1572, after he had been a year at Valence, he was recalled home; and he arrived in Paris in time to be present at the marriage of Henry, the young king of Navarre, and to witness the horrors of the massacre of St. Bartholomew which followed. The next year he embraced an opportunity of visiting Italy, in the suite of Paul de Foix, who was sent by Charles IX. on a mission to certain of the Italian courts. In 1576 he made a journey to Flanders and Holland. In 1578 he succeeded Jean de la Garde, Sieur de Saigne, as one of the ecclesiastical counsellors of the parlement de Paris; but he soon after abandoned all ideas of the church as a profession, and in 1584 resigned his rank as counsellor, being appointed master of requests, an office which was then wont to be held indifferently by ecclesiastics or laymen. Two years after he obtained the reversion of the place held by his uncle, of one of the présidents au mortier in the parlement de Paris. When, in the next year, in the increasing distractions of the state, Henry III. found himself obliged to leave Paris, De Thou accompanied his majesty to Normandy, and afterwards to Picardy. At Chartres, in August, 1588, he was admitted a counsellor of state; and from this date he took a leading part in all the principal public transactions which followed, being distinguished throughout for his adherence to the King. After the accession of Henry IV. he was constantly with the King, or employed on missions to different quarters in his service. In 1591, on the death of Amyot, bishop of Auxerre, his majesty bestowed the office of keeper of the royal library on De Thou. In 1594 the death of his uncle opened to him his reversionary office of one of the presidents of the parlement de Paris. Among other important transactions in which he had a part after this, was that of the Edict of Nantes, published in 1598, which he was greatly instrumental in arranging. He has left an account of his own life, in ample detail, down to 1601. In 1604 he published the first eighteen books of his 'History,' which he had commenced in 1593, and conceived in his mind fifteen years before. The work was received with general applause, and, although some things in it gave umbrage to the more zealous friends of the Roman Catholic faith, it was not till 1609, when a second portion of it had been published, that it was formally stigmatised by being inserted in the 'Index Expurgatorius.' The death of Henry IV., in 1610, did not deprive De Thou of his place in the ministry, nor prevent him from receiving a new appointment as one of the finance directors on the retirement of Sully, but he had no longer the same influence; and disappointments and domestic distress are supposed to have shortened his life. He died at Paris, May 7, 1617. He left three sons and three daughters, one of the former of whom, François Auguste de Thou, the inheritor of his father's virtues and of a considerable share of his talents, was put to death by Richelieu for his alleged participation in what was called the conspiracy of Cinq Mars, Sept. 12, 1642.

The president De Thou is the author of a number of Latin poems, one of the principal of which, entitled 'De Re Accipitrariâ' (on Hawking), was published in 1584; but his fame rests upon his 'Historia sui Temporis,' or 'History of his own Time,' written also in Latin, in 138 books, of which the first 80 appeared in his lifetime, the remainder not till 1620. The best edition, which includes the Autobiography, is that published at London in 1733.

THOUARS. [Se'vres, Deux.]

THOUARS, LOUIS MARIE AUBERT DU PETIT, was born at the château de Boumois, in Anjou, in 1756. His family was wealthy and noble, and being destined for the army, he was early sent to the school of La Flèche. He was made a lieutenant of infantry at the age of sixteen. This was in a time of peace, and he occupied his leisure in studying the science of botany and its literature. At the time of the loss of La Perouse and his companions, Aristide du Petit Thouars proposed to his brother Aubert that they should go in search of him. To this he willingly consented, hoping to add to his stock of plants and his fame by the voyage. The two brothers sold their patrimony, raised a subscription, and having secured the patronage of Louis XVI., were ready to start on their voyage, when a curious accident separated them. The ship that was to have taken them lay at Brest, and Aubert, with his vasculum (the tin box which botanists carry to put their plants in) at his back, intended to botanise on his way from the capital to the port. He was however found by some gens d'armes in the woods, and being suspected as an enemy of his country in those days of disorder, he was arrested and thrown into prison at Quimper. He was however soon released, but too late, as his brother had sailed. He followed him to the Isle of France, but his brother had again departed; and being here without money and without friends, his only resource was his botanical knowledge, and he accordingly applied for employment to some of the rich planters of that island. He quickly obtained an engagement, and remained in the island nearly ten years. On this spot he was very favourably placed for making those observations for which his previous studies had so well prepared him; and during his stay here he collected most of the materials for the numerous works which he published on his return. Whilst a resident in the Isle of France he made a voyage to Madagascar, and collected plants from that island. He returned to Paris in 1802. Many of the results of his researches in the Isle of France and Madagascar were communicated to the Institute and other scientific bodies in Paris. He died in May, 1831.

THOUROUT. [Flanders, West.]

THRACE (Θρᾴκη, *Thracia*) was in earlier times the name of the country bounded on the N. by the Danube, on the S. by the Propontis and the

Ægean Sea, on the E. by the Black Sea, and on the W. by the river Strymon and the chain of mountains which forms the continuation of Mount Rhódope. This country is divided into two parts by Mount Hæmus (the Balkan), which runs from west to east, separating the plain of the lower Danube from the rivers which flow into the Ægean Sea. This mountain probably derived its name from its cold and snowy top, since Hæmus seems to contain the same root as the Sanscrit *hima*, 'snow,' whence also comes the name of the Himâlaya Mountains. Two extensive ranges branch off from the southern side of Mount Hæmus: one at about 100 miles from the Euxine, which runs in a south-eastern direction towards Constantinople; the other, which is far larger, branches off near the sources of the Hebrus, and likewise runs to the south-east. The latter bore the name of Rhodope, and is now called the Despoto Mountains. Between these two ranges there are many plains, which are drained by the Hebrus (the Maritza), the principal river of Thrace, and its tributaries.

In ancient times there was a great quantity of corn and wine grown in the valley of the Hebrus. In the 'Iliad' the ships of the Achæans are described as bringing wine every day to Agamemnon from Thrace (ix., 72); and the Maronean wine, which retained its reputation in the time of Pliny ('Hist. Nat.,' xiv. 6), is spoken of in the 'Odyssey' (ix., 197). In the mountainous parts of the country there were also mines of precious metals.

The Thracians were divided into many independent tribes; but the name of Thracians seems to have been applied to them collectively in very early times. The Thracian nation, according to Herodotus (v., 3), was, next to the Indians, the most numerous of all, and if united under one head would have been invincible. He describes them as a barbarous people who sold their children as slaves. They were temporarily conquered by Darius I., king of Persia, with the exception of one tribe. During the Peloponnesian war, which began B.C. 431, there was a powerful Thracian empire under a King Sitalces; and we often read of the Thracians during the contests between Athens and Macedonia. Philip, the father of Alexander, reduced the whole of southern Thrace to subjection, B.C. 343, and compelled it to pay tribute. Under Alexander the Great the Thracians attempted to throw off the yoke, but the young king promptly checked the rising. On the death of Alexander, Thrace fell to the share of Lysímachus, who erected it into an independent monarchy; but it subsequently came under the dominion of the Macedonian kings. In the Roman war against Perseus, Cotys, king of the Thracians, is mentioned as an ally of Perseus; though the Thracians, just before the war broke out, had sought the alliance of the Romans. On the conclusion of the war however Cotys was allowed to continue in possession of his kingdom, notwithstanding the assistance he had rendered to Perseus. (Livy, xlv. 42.)

At what time Thrace was reduced to the form of a Roman province is uncertain, but it seems not to have constituted a distinct province till a late period. Under Augustus, the part of Thrace north of the Hæmus was conquered by the Romans, and was afterwards erected into a separate province under the name of Mœsia. The name of Thrace was then confined to the country south of the Hæmus, and between the Euxine, the Propontis, and the Ægean Sea. Its boundary on the west differed at various times: in the time of Ptolemæus it seems to have been the Nestus; but the Strymon was anciently the boundary between Macedonia and Thrace.

THRAPSTON. [NORTHAMPTONSHIRE.]

THRASYBU'LUS, the son of Lycus, was born at Steiria in Attica. In B.C. 411 the oligarchical party at Athens gained the ascendency, and formed a new senate of 400 members. The oligarchs in the fleet stationed at Samos endeavoured to bring about a similar revolution there, but their efforts failed; and among the men who exerted themselves to maintain the democratical constitution, Thrasybulus, who then had the command of a trireme, was foremost. The generals who were known to belong to the oligarchs were removed, and Thrasybulus and Thrasyllus were appointed in their stead. The army under their command assumed the power of the people of Athens, and in an assembly of the camp Thrasybulus got a decree passed, by which Alcibiades, who had lately been the chief support of the democratical party, and who was living in exile with Tissaphernes, should be recalled. In 410 B.C. he greatly contributed to the victory which the Athenians gained in the battle of Cyzicus. In B.C. 408, when Alcibiades returned to Athens from Byzantium, Thrasybulus was sent with a fleet of eighty galleys to the coast of Thrace, where he restored the Athenian sovereignty in most of the revolted towns. In B.C. 406 Thrasybulus was engaged as one of the inferior officers in the Athenian fleet during the battle of Arginusæ; and after the battle he and Theramenes were commissioned by the generals to save the men on the wrecks. [THERAMENES.] Thrasybulus is not charged with any improper act during the proceedings against the generals.

During the government of the Thirty Tyrants at Athens, he was sent into exile, and took refuge at Thebes. The calamities under which his country was suffering roused him to exertion. With a band of about seventy, or, according to others, of only thirty fellow-exiles, he took possession of the fortress of Phyle, in the north of Attica. With this small force, which was gradually increased, he obtained several advantages over the troops which the Thirty sent against him.

The Thirty now began to be alarmed at the success of the exiles, and thought it necessary to secure a place of refuge in case the exiles should succeed in getting possession of Athens. For this purpose they, or rather Critias, devised a most atrocious plan. By fraud and force he contrived to secure 300 citizens of Eleusis and Salamis capable of bearing arms; and after they were conveyed to Athens, he compelled the 3000 and the knights to condemn them to death. All were accordingly executed, and Eleusis was de-

prived of that part of its population to which it might have looked for protection. In the meantime the number of exiles at Phyle had amounted to one thousand, with whom Thrasybulus marched by night to Piræus, where he was joyfully received, and great numbers of other exiles increased his army. The Thirty no sooner heard of this movement than they marched against Piræus with all their forces. The army of the tyrants was put to flight, and driven back to the city. Critias fell in the contest.

An assembly was now held in Athens, in which the Thirty were deposed, and a college of ten men, one from each tribe, was appointed to conduct the government. Two of these ten had formerly belonged to the Thirty, and the rest of the Thirty withdrew to Eleusis. As regards the army of exiles under Thrasybulus, the new government of Athens was no less determined to put them down than the Thirty had been. Thrasybulus continued to strengthen himself, and to prepare for further operations. As the danger from the exiles became imminent, the Ten of Athens applied to Sparta for assistance. At the same time the faction at Eleusis also sent envoys to Sparta; but the government of Sparta refused to send an army for an undertaking from which it could reap no advantages. However Lysander, as harmostes, obtained leave to levy an army, and his brother Libys was appointed admiral to blockade Piræus. Lysander went to Eleusis, and got together a numerous army. Being thus enclosed by land and by sea, Thrasybulus and his army had no prospect except to surrender.

But the influence which Lysander had acquired excited the envy of the éphori and kings, and they were now bent upon thwarting his plans. King Pausanias was accordingly sent out with an army to Attica, in reality for the purpose of preventing the designs of Lysander. After several sham manœuvres against the exiles, Pausanias gained a victory over them without following it up. He now sent secretly an embassy to them, requesting them to send a deputation to him and the éphori. At the same time he invited the pacific party at Athens to make a public declaration of their sentiments. Hereupon a truce was concluded with the exiles, and a deputation was sent to Sparta to negociate a settlement of affairs. The éphori appointed fifteen commissioners, in conjunction with Pausanias, to settle all the differences between the parties in Attica. The commissioners proclaimed a general amnesty, from which none were to be excluded except the Thirty, the Eleven, and the Ten who had formed the government of Piræus. Sparta guaranteed the execution of the proclamation. Pausanias withdrew his forces, and Thrasybulus at the head of the exiles entered Athens in triumph, and marched up the Acrópolis to offer thanks to Athena. An assembly was then held, in which Thrasybulus impressed upon all parties the necessity of strictly observing the conditions of the peace.

Eleusis was now the seat of the most violent of the oligarchical party, and they still indulged some hope of recovering what was lost. They assembled a body of mercenaries to renew the civil war; but Athens sent out a strong force against them. The popular party showed the greatest moderation, and after the quelling of the Eleusinian rebellion Thrasybulus induced the Athenians to proclaim a second amnesty, from which no one was to be excluded. This amnesty was faithfully observed. The first step after the abolition of the oligarchy was the passing of a decree which restored the democratic form of government.

Thrasybulus was no less active in restoring Athens to her former greatness, than he had been in wresting her from the hands of her enemies. His last military undertaking belongs to the year B.C. 389, when the government of Athens placed a fleet of 40 galleys at his command. In Thrace he settled a dispute between two princes, and gained them as allies for Athens. At Byzantium and Chalcédon also the influence of Athens was restored, and with it new sources of revenue to the republic were opened. After this he sailed to Mityléne, the only town in the island of Lesbos in which the Spartan party had not gained the ascendency. Thrasybulus here fought a battle with Therímachus, the Spartan harmostes, who was defeated and slain. He sailed along the southern coast of Asia Minor to levy some contributions there. His fleet cast anchor in the mouth of the river Eurýmedon in Pamphylia, near Aspendus; and in consequence of some outrage committed by his soldiers on land, the Aspendians during the night surprised and killed Thrasybulus in his tent, in B.C. 389.

THRASYBU'LUS, a tyrant of Syracuse, a son of Gelo, and brother of Hiero the Elder, who ruled over Syracuse till the year B.C. 466. Hiero was succeeded by his brother Thrasybulus, who was a bloodthirsty tyrant. Great numbers of citizens were put to death, and others sent into exile, and their property filled the private coffers of Thrasybulus. He got together a large force of mercenaries, and carried his cruelties so far, that the Syracusans determined to rid themselves of him. He was finally driven out, after having scarcely reigned one year, and went to Locri in southern Italy, in B.C. 466, an exile.

THRASYMENE LAKE. [PERUGIA.]

THREAD, a small line formed by twisting together fibres of vegetable or animal substances, as flax, cotton, or silk. Sewing-thread, and the various kinds of thread used in the manufacture of bobbin-net, lace, and some other kinds of textile fabric, consist of two or more *yarns*, or simple spun threads, firmly united together by twisting, just as a rope-strand consists of several yarns or distinct cylinders of hemp.

The operation of combining yarns of cotton or linen into thread is performed by a machine called a doubling and twisting frame, somewhat resembling the throstle of the cotton-spinner. Along the centre of the machine is an elevated creel or frame-work, which supports two parallel rows of cops or bobbins of yarn, one row towards each side of the machine. From the cops the yarns are conducted over horizontal glass rods, which are fixed parallel with the creel, and thence down-

wards into troughs filled with water or very thin starch-paste, which by moistening the yarns facilitates the subsequent process of twisting. After being wetted, the yarns pass over the rounded edge of the trough, which is covered with flannel for the purpose of absorbing the superfluous moisture; and thence under and partly around an iron roller, which is made to revolve with any required velocity by a train of wheel-work. Upon this roller rests another, of box-wood, which revolves solely by contact with the iron roller, its axis playing in vertical slots. In passing under the iron roller, then between it and the wooden roller, and finally over the latter, the yarns required to form the thread are brought together and slightly compressed; and they are finally twisted by apparatus very like that used in throstle spinning.

THREATS and THREATENING LETTERS. Threats of personal violence, or any other threats by which a man of ordinary firmness and prudence may be put in fear, and by means of which money or other property is extorted from him, amount to robbery. By the 7 Will. IV. and 1 Vict., c. 87, sect. 7, a person demanding by menaces any property of another with intent to steal the same, is declared to be guilty of felony, and is liable to imprisonment for any term not exceeding three years. It is a misdemeanor at common law to threaten another in order to deter him from doing some lawful act, or to compel him to do an unlawful one, or to extort money or goods from him, or to obtain any other benefit to the person who makes the threat.

The offence of sending or delivering letters or writings, threatening to kill or injure the person to whom they are sent or delivered, or to burn his house, or to accuse him of some heinous crime, for the purpose of extorting money, was formerly considered to be high treason (stat. 8 Hen V., c. 6); and under the stat. 9 Geo. I., c. 22, continued for more than a century to be punishable as a capital felony. But by the 4 Geo. IV., c. 54, s. 3, it was enacted that, 'if any person shall knowingly and wilfully send or deliver any writing, with or without any name or signature subscribed thereto, or with a fictitious name or signature, threatening to kill or murder any person, or to burn or destroy his house, outhouse, barns, or stacks of corn or grain, hay or straw, the offender shall be guilty of felony, punishable with transportation for life or not less than seven years, or imprisonment for any term not exceeding seven years.' By the 7 and 8 Geo. IV., c. 29, s. 8, it is enacted that, 'if any person shall knowingly send or deliver any letter or writing, demanding of any person with menaces, and without any reasonable or probable cause, any chattel, money, or valuable security; or if any person shall accuse, or threaten to accuse, or shall knowingly send or deliver any letter or writing accusing or threatening to accuse any person of any crime punishable by law with death, transportation, or pillory, or of any assault with intent to commit any rape, or of any attempt or endeavour to commit any rape, or of any infamous crime (the meaning of which term is specially defined in the 9th section of the same statute), with a view or intent to extort or gain from such person any chattel, money, or valuable security,' every such offender shall be guilty of felony, and shall be punishable with transportation for life or not less than seven years, or with imprisonment not exceeding four years, with or without whipping.

THREE, RULE OF, the technical name of the rule in arithmetic by which three quantities being given, the first and second of one kind, a fourth is found such that the four are in proportion, or that the first is the same multiple part, or parts, of the second, which the third is of the fourth.

The immense variety of questions which are to be solved by finding a fourth proportional defies all classification: but they may all be reduced to one form, though it may in particular cases not be easy to see the mode of reduction. That form is:—A produces B; what will C produce? It may be that it is money which produces goods, or goods which produce money, or money which produces interest, or money of one country which produces money of another, or time which produces distance travelled, &c. &c. &c. The difficulty to beginners is the reduction of the question given to the above simple form, which must be done before what is (or used to be) called the *statement* of the question can be made, namely, the writing down the numbers A, B, C, in the proper order, with the marks of proportion between them:

A : B : : C : the answer required.

It is proper enough to say that this is a question of proportion when numbers only are considered: but absurd when the things represented by the numbers are used instead of the numbers. Thus, if 5 pence buy 10 apples, 7 pence will buy 14 apples, and the number 5 is to 7 as 10 is to 14, or 5 is the same fraction of 7 as 10 is of 14. But it is absurd to say that 5 pence bear the same proportion to 10 apples that 7 pence bear to 14 apples: simply because 5 pence are not any assignable fraction of 10 apples. That there is a *relation* is true: but that relation is not proportion. Thus, it is not absurd to say, in the common language of the rule, As 5 pence are to 10 apples, so are 7 pence to 14 apples; for the first does stand to the second in the same relation as the third to the fourth: 5 pence must, at all rates, do as much towards the purchase of 10 apples as 7 pence towards that of 14 apples. With this understanding there is no objection to the common mode of statement, and the proof of the rule is as follows:—If A of the first produce B of the second, then, at the same rate of production, 1 of the first must produce $\frac{B}{A}$ of the second; whence C of the first must produce $C \times \frac{B}{A}$, or $\frac{CB}{A}$ of the second.

The principal caution which a beginner requires is—not to suppose that the rule of three (or the rule of finding a fourth quantity which, with three others, shall constitute a proportion) is to be applied in all cases in which three quantities

are given to find a fourth. That such a caution is necessary arises from the defect of works on arithmetic; which frequently exhibit this rule without any mention of proportion, and leave it to be inferred that there is but one way of obtaining a fourth quantity from three others.

THRINCIA, a genus of plants belonging to the natural order *Compositæ* and the suborder *Cichoraceæ*. *T. hirta*, the only British species, is found chiefly in gravelly soil.

THROCMORTON, SIR NICHOLAS, was descended from an ancient family in Warwickshire. His father, Sir George Throcmorton, had been in favour with Henry VIII., but was imprisoned for several years in the Tower of London, for refusing to take the oath of supremacy. Nicholas, who was Sir George's fourth son, was born about 1513. Having been appointed page to the Duke of Richmond, he accompanied his master to France, and remained in his service till the Duke's death.

Sir George Throcmorton was released from the Tower in 1543. His son Nicholas was then appointed Sewer to the king. In 1544 he headed a troop in the armament against France which Henry VIII. commanded in person, for which he was rewarded with a pension. In 1547 he distinguished himself in the campaign in Scotland under the Protector Somerset. He was soon afterwards created a knight, appointed to a place in the privy-chamber, and made under-treasurer of the Mint. He sat in parliament during Edward VI.'s reign as member for Northampton. On the death of that king, Sir Nicholas, though a Protestant, acted as a supporter of Queen Mary.

On Feb. 2, 1554, he was committed to the Tower on a charge of being concerned in the rebellion of Sir Thomas Wyatt. On April 17 he was brought to trial at Guildhall, London. There is little doubt that he was to some extent implicated in the rebellion. He was tried before commissioners, some of whom were bitterly inimical to him. But Sir Nicholas conducted his own defence with such admirable adroitness, that, in defiance of the threats of the chief justice and the attorney-general, he obtained a verdict of acquittal.

After his release, which was not till Jan. 18, 1555, he avoided the approaching storm of persecution by going to France, where he remained till 1556. After Mary's death, Elizabeth gave him the offices of chief butler of England, and chamberlain of the Exchequer. In 1559 he was sent on an embassy to France, and remained at the French court till the beginning of 1563. Dr. Forbes has published the greater part of Throcmorton's correspondence with his own government while he was in this confidential situation.

In 1565 Throcmorton was sent on a special embassy to Scotland, to remonstrate with Mary Queen of Scots against her intended marriage with Darnley; and, when Mary was imprisoned at Lochleven in 1567, Throcmorton was commissioned by Elizabeth to negociate with the rebel lords for her release. In 1569 Throcmorton was sent to the Tower on a charge, which indeed appears to have been well founded, of having been engaged in the intrigue for a marriage between Mary Queen of Scots and the Duke of Norfolk. Though he was not kept long in confinement, he never afterwards regained the confidence of Elizabeth. He died Feb. 12, 1571.

THROMBUS is a tumour formed by blood effused from a vein after bleeding, and coagulated in the adjacent cellular tissue.

THROSTLE. [THRUSHES.]

THRUSH, or Aphthæ, is a disease which commonly appears in the form of minute opaque-white vesicles scattered over the interior of the mouth and fauces. Vesicles or blisters of this kind often appear in a succession of eruptions, those which were first formed bursting and leaving tender and raw surfaces, while others are breaking out; and thus continuing through the whole course of some general disorder of the system.

It arises from a disordered state of the system, and alterative medicines are required. Gargles, consisting of a drachm of alum to a pint of water or acidulated infusion of roses, or of one or two drachms of sub-borate of soda to half a pint of water, are often beneficial; and so is the mel boracis of the Pharmacopœia, when a small quantity of it is held for a few minutes in contact with the affected part.

THRUSHES, a group of birds constituting the family *Merulidæ* of Vigors. [MERULIDÆ]. Mr. G. R. Gray adopts the name of *Turdidæ* for the thrushes, and divides them into five subfamilies, viz. *Formicarinæ*, *Turdinæ*, *Timalinæ*, *Oriolinæ*, and *Pycnonotinæ*.

As examples of European Thrushes, we may mention the Song Thrush, or Throstle (*Turdus musicus*); the Blackbird (*Merula vulgaris*); the Ring Blackbird or Ouzel (*Merula torquata*); the Missel Thrush (*Turdus viscivorus*); the Redwing (*Turdus Iliacus*); the Fieldfare (*Turdus pilaris*); the Water Ouzel (*Cinclus aquaticus*); &c.

The Throstle, Mavis, or Song Thrush (*Turdus musicus*) needs no description. Its plumage, its habits, its mode of nidification, and its rich varied strain, are known to all. It inhabits every country in Europe, but although permanent in our islands, it is a bird of passage in Germany, Norway, Sweden, Denmark, and Russia, migrating southwards in large flocks, some of which are carried by a north-east wind to our islands, whence they continue their journey still farther southwards. This species is the *Grive* and *Petite Grive* of the French; *Tordo*, *Tordo commune*, and *Tordo Bottaccio* of the Italians; *Sing-Drossel*, or *Weiss-Drossel*, of the Germans.

Of Asiatic Thrushes we may notice the *Turdus erythrogaster* from the Himalaya Mountains (see Gould's 'Century'); and of African Thrushes the *Turdus strepitans* (*Merula Letsitsirupa*) of Smith. (See 'Illustrations of the Zool. of South Africa.')

America presents us with the Tawny or Wood Thrush, *Turdus mustelinus* (*Turdus melodus*, Wilson), celebrated for its rich song; the Cat-Bird (*Turdus lividus*, Wilson); the Ferruginous Thrush (*Turdus rufus*); and the far-famed Mocking Bird *Turdus polyglottus* (*Orpheus polyglottus*, Swainson). [MOCKING BIRD.]

THUANUS. [THOU, DE.]

THUCY'DIDES, the son of O'lorus, or Orolus,

and Hegesipyle, was a native of Attica. If he was forty years old at the commencement of the Peloponnesian war, according to the statement of Pamphila ('Gellius,' xv. 23), he was born in B.C. 471. Our principal information respecting Thucydides is a biography of him written by Marcellinus, which is however full of contradictions and doubtful stories. Thucydides mentions incidentally a few facts concerning himself, which is almost all that we know with certainty about his life.

He was in Athens in the second year of the Peloponnesian war, B.C. 430, when he was one of those who had the plague. (Thucyd., ii. 48.) In B.C. 424 he was in command of an Athenian fleet of seven ships, which lay off Thasos. Brásidas, the Lacedæmonian commander, made an attempt to obtain possession of Amphípolis on the Strymon, which then belonged to Athens. Thucydides sailed to protect Amphipolis, but was only in time to save Eion, a seaport at the mouth of the Strymon. Amphipolis had fallen before he could arrive there. (Thucyd., iv., 102, &c.) For this he was either condemned to death or banished by the Athenians in the year following, B.C. 423; and he spent twenty years in exile, namely, till B.C. 403. (Thucyd., v., 26.) This year coincides exactly with the restoration of the democracy by Thrasybúlus, when a general amnesty was granted. Where he passed the time of his exile is not mentioned by himself. Marcellinus says that he first went to Ægina, and afterwards to Scapte-Hyle in Thrace, opposite the island of Thasos, where he had valuable gold mines. It appears not improbable that he visited several places during his exile: the intimate knowledge which he shows respecting the history of the Italiotes and Siceliotes almost inclines one to suppose that he may have visited Italy and Sicily after the failure of the Athenian expedition in the latter island.

How long he lived after his return from exile, and whether he continued at Athens till the time of his death, is uncertain. According to some accounts he was assassinated at Athens; according to others he died at Thasos, and his bones were carried to Athens.

The Peloponnesian War forms the subject of the history of Thucydides. Though he was engaged in collecting materials during the whole of the war, he does not appear to have reduced them into the form of a history till after his return from exile, since he alludes in many parts of it to the conclusion of the war (i., 13; v., 26, &c.). He did not however live to complete it: the eighth book ends abruptly in the middle of the year B.C. 411, seven years before the termination of the war. Even the eighth book itself does not seem to have received the last revision of the author. The first two books of Xenophon's 'Héllenica' complete the history of the Peloponnesian War, and were not improbably published by Xenophon, together with the eight books of Thucydides.

The first book of Thucydides is a kind of introduction, and the history of the war commences with the second book. The object of the history of Thucydides was to give such a faithful representation of the past as would serve as a guide for the future (i. 22). His observation of human character was profound; he penetrates into the motives and policy of the leading actors of the war; and he draws from the events he relates those lessons of political wisdom which have always made his work a favourite study with thoughtful men. He claims the merit of the strictest accuracy, and it is impossible to read his history without being convinced of the trustworthiness of his statements. His impartiality also is conspicuous. Although a contemporary, and one who had taken an active part in public affairs, he writes as free from party feeling as if he had lived long subsequent to the events which he narrates.

Thucydides pays great attention to chronology. He divides each year into two portions, the summer and the winter, and is careful to relate under each the events that took place respectively during that time. The speeches which he introduces contain the general sense of what the speakers actually delivered, or might have delivered, although the language is his own (i. 22).

The style of Thucydides is marked by great strength and energy; but he is often obscure. His sentences are often long, and the constructions harsh and involved. These remarks are more especially applicable to the speeches, which Cicero found as difficult as we do.

Among the modern editions, those most worthy of notice are Poppo's, which contains two volumes of prolegomena, with the scholia and numerous notes, Leipzig, 10 vols. 8vo., 1821–1838; Haack's, with selections from the Greek scholia and short notes, 2 vols. 8vo., Leipzig, 1820, reprinted in London in 3 vols. 8vo., 1823; Göller's, 2 vols. 8vo., Leipzig, 1836, 2nd edition, reprinted in London; and Arnold's, 3 vols. 8vo., Oxford.

The first English translation was made by Thomas Nicolls, from the French version of Seysel, and was published in London, 1550, fol. This was succeeded by the translations of Hobbes and William Smith. There are more recent translations by Bloomfield and by Dale.

THUIN. [HAINAULT.]

THUJA, or THUYA, the name of a genus of plants belonging to the natural order *Coniferæ*. The species of the genus are more commonly known by the name of *Arbor Vitæ*, but why this name has been given to them is a matter of uncertainty. It belongs to the section of *Coniferæ* called *Cupressinæ* by Richard, in which *Cupressus, Callitris, Taxodium,* and *Juniperus,* are also included. The species are evergreen, either trees or shrubs, and are inhabitants of Asia, Africa, and North America.

T. occidentalis, the Western or American Arbor Vitæ, is a large shrub or small tree, but is a native of North America, from Canada to the mountains of Virginia and the Carolinas. It is not so frequent in the southern states, but is found there on the steep banks of mountain-torrents. In the northern states of America it is sometimes called the White Cedar, but more commonly Arbor Vitæ. It grows best in cool moist places, on the borders of rivers and lakes,

and in swamps, some of which it covers to the extent of 50 to 100 acres. The stem of this tree seldom rises straight from the ground, but makes a short bend before it becomes straight. On this account it is difficult to obtain trunks of any length, and, although the timber is very durable, it is not much used in building. In Great Britain the American Arbor Vitæ is planted as an ornamental shrub, for which purpose it flourishes best in low moist and sheltered situations. *T. orientalis*, the Oriental or Chinese Arbor Vitæ, is a native of rocky situations in Siberia and China, and on the mountains of Japan. It is a low tree and easily distinguishable from the American species by its denser foliage and lighter green colour. It is a hardy plant, and flourishes in the gardens about London, where it was first introduced by Miller in 1752. *T. pendula*, the Pendulous or Weeping Arbor Vitæ, is a native of Tartary, and is an elegant shrub, but only a few specimens exist at present in this country. *T. articulata* of Desfontaines is now called *Callitris quadrivalvis*, Four-Valved Callitris. It is a native of Barbary, and attains a height of from 15 to 20 feet. It was first discovered by Desfontaines on Mount Atlas in 1796. The gum-sandarac of commerce, according to Broussonet, Brongniart, and others, is the produce of this tree, though it is often ascribed to the *Juniperus communis*.

THULDEN, THEODOR VAN, born at Bois-le-Duc in 1607, was one of the most distinguished scholars and assistants of Rubens, and is said to have executed the greater part of the celebrated series of the so-called Gallery of the Luxembourg, painted in honour of Mary de' Medici. He excelled in various opposite styles, but in his great works he invariably followed Rubens, for whom, though less bold in design and less rich in colouring, he may frequently be mistaken. The Martyrdom of St. Andrew, in St. Michael's Church at Ghent, was painted by him, and was long thought to be a work of Rubens. His etchings are numerous, and in a masterly style: he published a set of 58 plates from the paintings of Nicolò Abati at Fontainebleau, after the designs of Primaticcio, which are greatly valued. Van Thulden died at Bois-le-Duc in 1676.

THUN, a town in the canton of Bern in Switzerland, situated on the river Aar, about a mile below its egress from lake Thun. Part of the town stands on an island formed by the river, and part is on the right bank, at the foot of a hill, on which is built the castle, the residence of the former counts of Thun. The parish church, with its lofty tower, is a remarkable building. There are also a handsome town-house, an hospital, an orphan asylum, a public library of 7000 volumes, and a military school. The population is about 5000. The lake of Thun is 14 miles long, 3 broad at its greatest width, and about 700 feet deep. Its surface is 1780 feet above the sea. A steamboat plies on the lake.

THUNBERG, CARL PETTER, was born Nov. 11, 1743, at Jönkoping in Sweden, where his father was a clergyman. He was early sent to the university of Upsal for the purpose of studying medicine, and became a pupil of Linnæus. He graduated in 1770, and had bestowed upon him the Kohrean pension for three years. He then left Upsal for the purpose of visiting Paris and the universities of Holland. In 1771, a situation as surgeon to one of the Dutch East India company's vessels having been obtained for him, he sailed from Amsterdam for Japan, his object being to explore the vegetable treasures of that country. He landed at the Cape of Good Hope, made several excursions into the interior, and after having remained at the Cape three winters, he set sail in 1773 for Java and the Japan Isles. He remained in these islands five years, making large collections of the plants, as well as observations on the habits, manners, and language of the inhabitants. He returned to his native country in 1779, making first a short stay in England. Here he formed the acquaintance of Sir Joseph Banks, Dryander, and Solander. During his absence he had been made demonstrator of botany at Upsal in 1777, and in 1784 was installed in the chair of Linnæus as professor of botany. In 1785 he was made a knight of the order of Wasa, and in 1815 commander of the same order.

On gaining his home, his first important work was 'Flora Japonica, sistens Plantas Insularum Japonicarum, secundum Systema Sexuale emendatum,' 8vo., Leipzig, 1784. He subsequently published some botanical observations on this 'Flora,' in the second volume of the 'Transactions' of the Linnæan Society. In 1788 he commenced the publication of an account of his travels, under the title, 'Resa uti Europa, Africa, Asia, forattad åren 1770–1779,' Upsal., 8vo. His next work was a 'Prodromus Plantarum Capensium, Annis 1772–1775 collectarum, Upsaliæ, 1794–1800.' From 1794 to 1805 he published in folio, under the title 'Icones Plantarum Japonicarum,' Upsaliæ, a series of plates illustrative of the botany of the Japan Isles. These were followed by the 'Flora Capensis,' Upsaliæ, 1807–13, 8vo. In 1807, in conjunction with Billberg, he published the 'Plantarum Brasiliensium Decas Prima;' Upsaliæ, 4to. Besides the above works, on which the reputation of Thunberg as a traveller and a botanist mainly rests, he was the author of numerous memoirs and academical dissertations. He was elected an honorary member of sixty-six learned societies. He died Aug. 8, 1828.

THUNBERGIA, a genus of plants belonging to the natural order *Acanthaceæ*. The species are handsome climbing plants, with a fragrant odour.

THUNDER is an explosion accompanied by a loud noise, which is heard after a discharge of lightning from the clouds. The character of the noise is variable: it sometimes resembles that which is produced when a single piece of ordnance is fired; at other times it is a rolling sound like the successive discharges of several great guns; and occasionally it may be compared to a series of sharp reports from a fire of musketry.

The physical cause of the detonation which accompanies a flash of lightning is still the subject of conjecture. Lightning, by its heat, creates a partial vacuum in the atmosphere, and the sudden rushing of air into the void space produces the

sound; but various reasons have been assigned for its prolongation. It was formerly supposed that the rolling noise is merely the result of several echoes caused by the sound being reflected from mountains, woods, buildings, or clouds, or from the latter alone when a thunder-storm takes place over the ocean. But though the reflections of sound are, very probably, in part, or at times, the causes of the prolongation of the report arising from the explosion, yet it must be admitted that these will not always afford a satisfactory explanation of the phenomena. That which was first proposed by Dr. Hooke ('Posthumous Works,' 1705) possesses a higher degree of probability. The flashes of lightning, Dr. Hooke observes, are either simple or multiple: the first occupies but one small portion of space, and gives rise to an instantaneous report; the multiple flash takes place at different parts of one long line: if these parts are nearly in a straight line, and the observer is at one of its extremities, the reports, whether they take place at the same instant or in succession, will arrive at his ear at different times, depending wholly or partly on the distances. The flash of lightning and the report of the thunder take place in reality at the same moment; but since sound travels at the rate of 1100 feet per second, while the passage of light from the cloud to the observer may be considered as instantaneous, it follows that, on counting the number of seconds which elapse between the time of seeing the flash and hearing the report, the distance of the thunder-cloud from the observer may be ascertained if 1100 feet be multiplied by that number of seconds.

The experiments of Lavoisier and La Place have shown that the molecules of water, in evaporating, convey away from the earth a portion of the electricity which it contains, and which the water has acquired in being converted into vapour. This electricity becomes diffused in the upper regions of the atmosphere, and, when the vapours again become condensed so as to form globules of water, the electricity disposes itself on the surface of the globules in different quantities according to their magnitudes. When these globules have equal volumes, those quantities are equal; and, an equilibrium then subsisting with respect to electricity, no sensible effect is produced: but when a considerable difference takes place between the quantities of electricity on the different globules, the tendency of that element to return to a state of equilibrium causes it to pass rapidly in flashes from those globules which have more, to those which have less, than their mean quantity: and thus, if the condensation be great and take place suddenly, vivid flashes of lightning and loud peals of thunder may take place. The effect is probably the greatest when two masses of clouds in opposites states of electricity are carried rapidly against one another by winds blowing in contrary directions.

From the meteorological observations made by Dr. Scoresby, and Captains Phipps, Parry, and Ross, it appears that neither thunder nor lightning is known to take place beyond the 75th degree of N. latitude: even so low as the 70th degree those phenomena are very rare; and in the tables of Captain Parry the occurrence of thunder and lightning is mentioned but once between June, 1821, and September, 1823. Captain Franklin also, in 67½° N. lat., heard thunder on one day only between September, 1825, and August, 1826.

THUNDER-ROD, a rod of metal attached generally to a side of a building, and extending from below the level of the ground to a point several feet above the highest part of the roof, or of the steeple, if the building have one, in order to secure the edifice from the effects of thunder or lightning: the upper extremity of the rod or bar terminates in a point.

When a thunder cloud passes above an elevated object, it produces in the nearest part of the object the kind of electricity which is opposite to that of the cloud itself, so that a rapid and abundant communication takes place; either the electric matter in the cloud rushes towards the earth, or that of the earth rushes towards the cloud: and if the materials of the building are not good conductors of the fluid, the latter in its passage exerts an explosive action by which the building is destroyed or greatly injured. The thunder-rod, from the conducting property of its metallic substance, serves to convey the fluid harmlessly to the earth or air. When it has happened that there is an interruption of the communication, by the rod being broken, or even by being much diminished in magnitude in some part of its length, the electric fluid has been observed to pass between the parts of the rod above and below the place of fracture.

Buffon, and Dalibard, at his suggestion (1752), appear to have been the first persons who drew lightning from the atmosphere by means of pointed rods of metal; and in the following year M. de Romas elevated a paper kite to the height of 550 feet for the like purpose: this was about twelve months before Dr. Franklin, without any knowledge of what had been done in Europe, performed the like experiment in America. The object of the French philosophers was merely to obtain by those means electrical sparks or flashes of fire; but it is to Dr. Franklin that the world is indebted for the idea of raising pointed rods in order to secure buildings from the effects of atmospherical electricity; and the recommendation was immediately adopted both for edifices on land and ships on the water.

Some doubt exists concerning the distance to which the protecting influence of the thunder-rod extends, but it is generally supposed that this influence is limited by the circumference of a circle described about the rod with a radius equal to double its height above the top of the building. When the magazine at Purfleet was struck by lightning in 1777, the shock took place on an iron cramp which united two stones of the cornice, at the distance of 24 feet from the thunder-rod, measured horizontally; and the upper extremity of the rod was 11 feet above the top of the roof on which it was erected. Many similar instances may be cited: it may be inferred therefore that large buildings ought to be secured by several rods, and that the less these are elevated the greater

ought to be their number. Mr. Cavendish, Dr. Priestley, and other English philosophers, recommend them to stand 10 feet above the roof; and in France their height is sometimes more than 30 feet.

The most elevated objects are not always those which are struck by lightning; for in 1829 the sails of a mill at Toothill in Essex being at rest, the electric fluid left untouched the arm, which was in a vertical position, and fell on a knob of iron at the middle of one of those which was inclined to the horizon in an angle of 45°; and it has frequently happened that buildings containing in their walls conducting substances have been struck much below their summits by a lateral action of the fluid; bars or plates of metal in the side walls having served to attract it more powerfully than the materials on the roof.

Thunder-rods are frequently made to terminate at the upper extremity with one point in a vertical position, and about this a number of points diverge from the rod at different inclinations to the horizon: by this construction there is not only a probability that some of the points will be acute when others may have been blunted by the action of the atmosphere, but also among them there will always be one which presents itself in the most favourable position for attracting the electric fluid. Observations have not yet however been sufficiently multiplied to enable philosophers to decide whether conductors so terminated have any advantage over the more simple rods of Franklin.

The thunder-rod should be thick enough to carry the electric fluid to the ground without being melted by it; in general a cylindrical rod about half an inch in diameter will be sufficient to prevent this effect from taking place; whether of iron or copper, it should be covered above ground with a coating of paint; and the part under ground is usually formed with two or more branches in order to facilitate the passage of the electric fluid to the earth.

Many lofty buildings contain in their construction the means of securing them from the effects of lightning, and such is the case with the Monument on Fish-Street Hill. This building, whose height is more than 200 feet, is crowned with a metallic ball surrounded by bands which terminate in points tending upwards. From the ball descend four bars of iron which serve to support a flight of steps, of the same metal, and one of them is in connection with the iron railing which extends from the balcony to the ground.

A ship at sea, like an edifice on land, may, when there is an accumulation of electric matter in the upper part of the atmosphere, be struck aloft; or, when the atmosphere is in a contrary state, the lower part of the ship may be struck, the lightning in the latter case ascending along the mast: and ships unfurnished with metallic conductors have frequently suffered serious injury during thunderstorms, while those which have been so provided have generally escaped.

The rigid bars of Franklin are considered inapplicable, as conductors, to ships, and instead of them chains of copper have been generally employed; these are attached to the masts at their upper extremities; and, following the standing rigging, they pass down the ship's sides into the water. In 1822 Mr. Snow Harris proposed ('Observations on the Effects of Lightning on Floating Bodies'), and subsequently caused to be executed for ships, conductors consisting of slips of copper, of sufficient thickness to prevent them from being fused; these slips are inserted, in two layers, in a groove cut longitudinally along the mast, the joints of one layer being opposite the middle parts of the other, and they are fastened to the mast by copper screws. The whole line of metal passes down from the copper spindle at the top of the mast-head, and at the junctions of the upper and lower masts the slip is made to join a cylinder of copper which lines each sheave-hole; the lower part of the line is connected with a plate of copper which is fixed on the keelson, at the step, and from thence there is a communication with the water by three copper bolts which pass quite through the keel.

THURGAU, a Swiss canton, bounded N. by the lake of Constanz and the Rhine, E. and S. by the canton of St.-Gall, and W. by that of Zürich. It takes its name from the river Thur, which comes from the canton of St.-Gall, and crosses the middle part of it from E. to W. The valley of the Thur is separated from the basin of the lake of Constanz by a succession of hills which rise in terraces on both sides, and are intersected by several valleys. On the S. and W. sides other hills divide the Thurgau from the valley of the Toss in the canton of Zürich. The whole country belongs to the hilly region of Switzerland. [SWITZERLAND.] The climate of Thurgau is comparatively mild; a great part of the country is planted with fruit-trees, especially apple, pear, and cherry; the vine also thrives in several localities. The produce of corn is not sufficient for the consumption. Horned cattle, sheep, goats, and horses are numerous. The area of the canton is 269 square miles; and population in 1850, 90,940. German is the language of the country. The principal manufactures consist of cotton cloth and yarn, silk, and linen, These products, together with wine, cattle, oats, dried fruit, and cider, form the exports. The imports are—iron and metal ware, woollen goods, fine cotton yarn, salt, colonial articles, and wheat.

The chief town is *Frauenfeld*, which is situated in a fertile valley near the confluence of the Murg and the Thur. It is a small place with only 1300 inhabitants. The old castle, formerly the residence of the vogten or governors of Thurgau, the town-house, where the Helvetic diet used to assemble in the time of the old confederation, and the Protestant and Roman Catholic churches, are the chief buildings.

THURINGIA (*Thüringen*) is the historical name of an extensive tract of country in the central part of Germany, situated between the Hartz Mountains, the rivers Saale and Werra, and the Thüringerwald. Thüringen long gave the title of margrave to the elector of Saxony: it is now divided between Prussia, Saxe-Weimar, Saxe-Coburg, Schwarzburg-Sondershausen, and Schwarzburg-Rudolstadt.

THURLOE, JOHN, was born in 1616, at

Abbots Roding in Essex, of which place his father, the Rev. Thomas Thurloe, was rector. He was designed for the law. Through the interest of Oliver St. John, he was appointed, in 1645, one of the secretaries to the parliament commissioners for conducting the treaty of Uxbridge. He was called to the bar in 1647 by the society of Lincoln's Inn; and in March, 1648, he received the appointment of receiver or clerk of the cursitors' fines. In Feb. 1650 he was appointed one of the officers of the treasury of the Company of undertakers for draining Bedford Level. In 1651 he was at the Hague, as secretary to St. John and Strickland, ambassadors to the states of the United Provinces.

When Cromwell assumed the Protectorship, Dec. 1653, Thurloe was appointed his secretary of state, and in the February succeeding, elected a bencher of the society of Lincoln's Inn. He was elected member for the Isle of Ely in Cromwell's second parliament, called in June, 1654, and re-elected for the Isle of Ely in the next parliament, called Sept. 1656. Cromwell obtained from this parliament an act settling the office of post of letters, both inland and foreign, in the state for ever, and Cromwell let it to Thurloe at a rent of 4000*l.* a year.

On July 13, 1657, he was sworn one of the privy council to the Protector. In 1658 Cromwell died. In the parliament that was called in December, Thurloe was solicited to sit for Tewksbury, but made his election to sit for the university of Cambridge.

The meeting of this parliament was the beginning of discontents and of Richard Cromwell's fall. It was one of the objects of the royalists in this parliament, to impeach Thurloe; but this object was yet undeveloped when the parliament was dissolved. Thurloe appears to have given strong counsel against the dissolution, the immediate consequence of which was the summoning, by Fleetwood and the council of officers, of the Rump of the Long Parliament, and Richard Cromwell's deposition.

On Jan. 14, 1660, Thurloe was succeeded in his office of secretary of state by Scot, one of the republican party; but he was re-appointed Feb. 27. His patent as chief postmaster had been cancelled in the interval. In the movements that followed for the restoration of Charles II., Thurloe made an offer of his services to those who were bringing about that event. He was accused by the parliament of high treason, May 15, and ordered to be secured; but a vote was passed, June 29, allowing him his liberty during the pleasure of the house.

After his release he retired to Great Milton in Oxfordshire. It is said that he was often solicited by Charles II. to resume public business, and refused. He died at Lincoln's Inn on Feb. 21, 1668. Thurloe's 'State Papers,' 7 vols. folio, 1742, contain a large mass of records of his official transactions, together with a number of private letters and papers. They have been edited by Dr. Birch.

THURLOW, EDWARD, LORD, was born in 1732, at Little Ashfield, near Stowmarket in Suffolk. His father, Thomas Thurlow, was a clergyman. Thurlow was educated at the Canterbury Grammar School, from which he went to Caius College, Cambridge. His character and conduct at the university did not promise any eminence in future life. Soon after he quitted Cambridge he was entered as a member of the Society of the Inner Temple. In Michaelmas term, 1754, he was called to the bar, and went the Western Circuit.

He soon obtained considerable practice, and in 1761 he obtained the rank of king's counsel. His practice in the courts rapidly increased, and, during ten years preceding his appointment as solicitor-general, was exceeded only by that of Sir Fletcher Norton and one or two others. His employment in preparing and arranging the documentary evidence for the trial of the appeal in the House of Lords against the decision of the Court of Session in the great Douglas Cause may have had the effect of bringing his talents, industry, and legal acquirements under the immediate notice of persons of power and influence, and of thus opening the way to his subsequent elevation.

In the new parliament called in 1768 he was returned for the borough of Tamworth, and became a supporter of Lord North's administration. Upon Dunning's resignation of the office of solicitor-general in March, 1770, and Blackstone's refusal to accept it, Thurlow received the appointment, and in January, 1771, he succeeded Sir William De Grey as attorney-general. Soon after his introduction to office, he attracted the notice of George III. by his zeal and energy in supporting the policy of Lord North's government respecting America, in which the king is known to have taken the warmest interest.

In the summer of 1778 Lord Chancellor Bathurst resigned his office; and on the 2nd of June in that year Thurlow was appointed his successor, and raised to the peerage with the title of Baron Thurlow of Ashfield in the county of Suffolk. Four years afterwards, in March, 1782, when Lord North was removed from power, and the Rockingham administration was formed, Thurlow remained in possession of the great seal by the command of the king, and in spite of Mr. Fox's opposition. When this administration was dissolved in February, 1783, upon the coalition formed between Lord North and Mr. Fox, Lord Thurlow was compelled to retire from office, notwithstanding the exertions of the king to retain him. Upon the dissolution of that ministry at the end of the same year in which it was formed, the great seal was restored to Lord Thurlow by Mr. Pitt, who then became prime minister. He held the office of lord chancellor for nine years after this re-appointment; and until the occurrence of the king's madness in 1788, appeared to act cordially with the rest of the cabinet; but when that event rendered a change of councils by means of a regency probable, he was suspected, with good reason, of some intriguing communications with the Prince of Wales and the Whigs, and was always subsequently regarded with distrust by Mr. Pitt and his colleagues. On the other hand Lord Thurlow took no pains to con-

ceal his dislike of Mr. Pitt. At last Pitt told the king that either the lord chancellor or himself must retire from the administration. The king at once consented to the removal of Lord Thurlow, who is said to have been deeply mortified. On his retirement from office a new patent was granted to him, by which he was created Baron Thurlow, of Thurlow, in the county of Suffolk, with remainder, failing his male issue, to his three nephews, one of whom afterwards succeeded to the title. He died at Brighton, in September, 1806.

THUROCZ. [HUNGARY.]

THURSO. [CAITHNESS.]

THYME. [THYMUS.]

THYMELA'CEÆ, a natural order of plants belonging to the tubiferous group of Incomplete Exogens. The name of this order is derived from *Thymelæa*, a plant spoken of by the ancients, and which some have supposed to be the *Daphne Gnidium*, a plant belonging to the present order. This order consists of shrubs or small trees. The species are found in Europe, but are not common; they occur in greatest abundance in the cooler parts of India and South America, at the Cape of Good Hope, and in Australia.

The most prominent property of this order is their causticity, which resides in their bark. When applied to the skin, it produces vesication, and pain in the mouth when chewed. The bark of several of the species is very tough, and may be manufactured into cordage. *Passerina tinctoria* yields a dye which is used in the south of Europe to colour wool yellow. The various species of *Daphne* possess active properties; some are used for dyeing, some are poisonous, and the *Daphne Lagetta* is the Lace-Bark Tree of Jamaica.

THYMUS, the name of a genus of plants belonging to the natural order *Lamiaceæ* or *Labiatæ*. Between twenty and thirty species have been described by botanists, most of them inhabitants of Europe, especially the region of the Mediterranean: one only is a native of the British Isles. *T. vulgaris*, Common or Garden Thyme, has a pungent aromatic odour and taste. These properties are communicated to water by infusion only to a slight extent. They depend upon an essential oil, an ounce of which may be obtained from thirty pounds of the plant. *T. serpyllum*, Wild Thyme, or Mother-of-Thyme, is a native of Great Britain, on hills and in dry pastures, and throughout Europe and the north of Asia. This plant has the same sensible properties as the last, but is more inclined to produce varieties, several of which have been described as species. These vary principally in the colour of the flowers and the size of the leaves and plant. One of the varieties, *T. s. citratus*, is known by the name of Lemon-Thyme on account of its scent resembling the lemon. The seeds will not however maintain this property: if required to be preserved, the plants must be propagated by means of slips or cuttings.

THYMUS GLAND (in the calf and lamb called the Sweetbread) is an organ situated behind the sternum, in the anterior mediastinum, in front of the pericardium and the large vessels arising from the base of the heart. In the embryo and the infant it has, in proportion to the rest of the body, a very considerable size; in after-life it becomes comparatively smaller, and at last nearly disappears.

The thymus gland is composed of a great number of similar small masses or lobules, which may be separated by dissection, and are held together by fine cellular tissue continued from that which invests the whole gland. The lobules vary in size from half a line to three lines in diameter, and have simple or complex cavities filled with a milky fluid. The fluid contained in the cells of the thymus gland is, in young and healthy animals, opaque and creamy.

Of its function scarcely anything probable is known.

THYNNUS, the subdivision of the genus *Scomber* (Mackerel) to which the fish called the Tunny belongs. The Tunnies differ from the Mackerels in the position of their first dorsal fins, which, instead of being separated from the second by a wide interval, are prolonged close to them. Round the thorax they have a corslet of larger scales, a character which is wanting in the subgenus *Scomber*. The Tunny and Bonito are the best known examples. The former fish has nine spurious finlets above and below; the latter has eight above and seven below.

The Tunny (*Thynnus vulgaris*, Cuvier) not unfrequently visits our coasts, following in the wake of pilchards and herrings, on which it preys. One specimen, captured near Greenock, in July, 1831, and now in the Andersonian Museum, was nine feet in length. In the Mediterranean an extensive fishery of Tunnies is carried on. The spectacle is described as being very exciting and as one of the amusements of the rich Sicilians; while the fish constitutes one of the most considerable branches of the commerce of the island. The flesh of this fish is as firm as that of the Sturgeon, but of much finer flavour, and is in great esteem on the Continent.

The Bonito (*Thynnus Pelamys*, Cuvier) is also an occasional visitor to the coasts of England, but its true realm is in the tropics. It is a very beautiful fish of a fine blue colour, with four dark lines extending from the pectorals along the side of the belly to the tail. It rarely exceeds thirty inches in length. The Bonito of the Mediterranean, a fish of equal beauty, is a distinct species, and is the *Pelamys Sarda* of Cuvier. Its back and sides are marked by dark oblique transverse bands. It has much stronger teeth than the Bonito of the tropics.

THYROID GLAND is an organ situated in the middle and fore part of the neck, in front and by the sides of the thyroid cartilage of the larynx (from which it has its name), and of the cricoid cartilage and the upper part of the trachea [LARYNX], to which it is closely fixed by cellular tissue. It is composed of two chief lateral portions or lobes, and a smaller portion or isthmus connecting them. A fourth portion, which is long and slender, and is named the middle column or horn, usually passes upwards from the isthmus in front of the larynx.

Of the function of the thyroid gland no more is known than of those of the spleen and thymus gland, between which it seems, in structure, to hold an intermediate place; resembling the spleen in its vascularity, which is far greater than is required for its nutrition, and the thymus in the existence of cells containing a fluid, and in its development during early life.

THYSANU'RA, apterous insects, with six legs and peculiar organs of motion on their sides, or at the extremity of the abdomen. They undergo no metamorphosis. They have been grouped by Latreille under two families, of which *Lepisma* and *Podura*, two Linnæan genera, are the respective types. In the first we have a number of brilliant silvery little insects, covered with small scales, which are used as tests for the powers of microscope glasses. They have long setaceous many-pointed antennæ, distinct palpi to the mouth, and moveable false feet on the sides of the abdomen; the body is terminated by articulated setæ, three of which are especially conspicuous. The *Podurellæ* have 4-pointed antennæ, indistinct palpi, an abdomen terminated by a forked tail, which is folded under the belly when the animal is at rest, and serves to aid it in leaping. They are little, long, soft insects. The *Lepismenæ* and *Podurellæ* live chiefly among wood or under stones.

TIA'RA, a kind of hat, in ancient times worn by the inhabitants of Middle and Western Asia, especially by the Persians, Parthians, Armenians, and Phrygians. There were two kinds of tiaras: the upright tiara was used by kings, priests, and other persons of the highest rank, and the upper part had frequently the shape of a crown; the tiara worn by other people was of a soft and flexible material, so that it hung down on one side, as in the case of the so-called Phrygian bonnet. In modern times the term tiara is applied to the head-dress of the popes, which is worn on solemn occasions, and consists of a triple crown. Hence it is also used in a figurative sense to designate the papal dignity.

TIARI'NI, ALESSANDRO, was born in 1577 at Bologna, where he studied painting under Prospero Fontana and Bartolomeo Cesi. He afterwards went to Florence, and while working there for a portrait-painter he attracted the notice of Domenico da Passignano, who admitted him into his studio as a scholar. Tiarini remained with Passignano seven years, and then returned to Bologna. His works are very numerous. Those in public places alone, in Bologna and its vicinity, and in Mantua, Modena, Reggio, Parma, Cremona, and Pavia, amount to upwards of two hundred. The following are the most celebrated:—A Miracle of St. Dominic, in the church of San Domenico at Bologna; the Exhumation of a Dead Monk, in the convent of San Michele in Bosco; and St. Peter repenting his Denial of Christ. Several of Tiarini's pictures have lost their colour, owing to his practice of glazing; in some the colouring consists entirely of glazed tints, the design being executed in gray. Tiarini died in 1668.

TIBALDI, PELLEGRI'NO, otherwise called Pellegrino Pellegrini, was born in 1527, at Bologna, where his father was a mason. It is not known by what means, or from whom Tibaldi received his first instruction in painting. In 1547 he visited Rome, where he seems to have been in great distress; but shortly afterwards we find him sent to Bologna by Cardinal Poggi to adorn his palace (afterwards occupied by the Academia Clementina), where he painted the history of Ulysses. For the same prelate he also painted the Poggi Chapel, which had been erected after Tibaldi's own designs. He was next employed at Loretto and Ancona, where he executed several works in fresco. As an architect he was employed to design, if not to execute, several buildings at Bologna, and the Palazzo della Sapienza, or Collegio Borromeo, at Pavia (which last was begun by Cardinal Carlo Borromeo in 1564). He restored the Archiepiscopal Palace, and executed other works at Milan, where he was appointed chief architect of the Duomo, or cathedral (1570). But the work which is considered his chef-d'œuvre is the Casa Professa, or house of the Jesuits at Genoa, with its church, &c. In 1586 Philip II. invited him to Madrid, where he was employed both as architect and painter, in which last capacity he executed many admirable frescoes in the Escurial. Liberally rewarded by Philip, who also conferred on him the title of Marquis of Valsolda, Tibaldi returned to Italy, after passing about nine years in Spain, and died at Milan, probably in 1598.

TIBALDI, DOMENICO, younger brother, not son, of the preceding, as he is sometimes called, was born in 1541. He designed and executed many buildings at Bologna, the principal among which are the Palazzo Magnani, the Dogana, or custom-house, the chapel in the cathedral, and the small church of the Madonna del Borgo. Domenico also practised painting and engraving. He died at Bologna in 1583.

TIBER. [Papal States.]

TIBE'RIUS CLAU'DIUS NERO was born in Rome, Nov. 16, B.C. 42. He belonged to the Claudia gens by the side of his father, Tiberius Claudius Nero, as well as his mother, Livia Drusilla, who was the niece of her husband. In the civil troubles the father followed the party of M. Antonius. Being compelled by Octavianus to fly from Rome, he escaped by sea, and hastened to M. Antonius, who was then in Greece. His wife and his infant son accompanied him in his flight. Tiberius the elder soon made his peace with Octavianus, who married his wife, Livia Drusilla, who was then pregnant with Nero Claudius Drusus. Tiberius must of course have divorced his wife before Octavianus married her: he died shortly afterwards, B.C. 38. Thus Tiberius the younger and his brother Nero Claudius Drusus became step-sons of Octavianus, who from the year 27 B.C. was Augustus.

Tiberius married Vipsania Agrippina, the daughter of Agrippa, and the granddaughter of Cicero's friend, T. Pomponius Atticus. She brought him a son, Drusus, and she was again with child, when Tiberius was obliged to sacrifice her to the policy of Augustus, who compelled him to marry his daughter Julia, the widow of Marcellus and of

Agrippa, and the mother of Caius and Lucius Cæsar (12 B.C.). Tiberius had a son by Julia, but her scandalous conduct soon disgusted him, and he withdrew from all intimate intercourse with her.

During this time Tiberius was twice entrusted with the 'cura annonæ,' or the looking after the supply of corn to Rome. He made his first campaign as tribunus militum in the Spanish war against the Cántabri. He afterwards restored Tigranes to the Armenian throne, and compelled the Parthians to restore the Roman eagles which they had taken from M. Crassus, in B.C. 63. In 15 B.C. he and his brother Drusus subdued the Alpine Rhæti; and Tiberius also terminated the war in Pannonia, which had lasted since B.C. 18. In B.C. 13 Tiberius was consul with P. Quintilius Varus. His brother Drusus, who was carrying on the war in Germany, died B.C. 9, in consequence of a fall from his horse. Tiberius, who was then in North Italy, hastened to the camp of Drusus on hearing of the accident, and arrived there just before Drusus died. Tiberius was successful in his contests and his negociations with the Germans. He gave up the command in B.C. 7, and returned to Rome to enjoy a triumph. In this year he was also consul for the second time.

In the midst of this prosperous career Tiberius left Rome and retired to the island of Rhodes, where he lived in retirement for eight years. The causes of this retirement are imperfectly known, but jealousy of the two youths Caius and Lucius Cæsar, his wife's sons by Agrippa, was probably the chief motive. Caius and Lucius were appointed the successors of Augustus in the same year that Tiberius went to Rhodes. Tiberius returned to Rome A.D. 2. In the same year Lucius Cæsar died at Massilia (Marseille), and his death was followed by that of his brother, A.D. 4. Augustus then adopted Tiberius as his future successor, and Tiberius in his turn was compelled by Augustus to adopt Drusus Germanicus, the son of his late brother Drusus Nero. Augustus also adopted M. Agrippa, the posthumous son of Agrippa and Julia, but he did not designate him as a successor in the Empire. The imperial throne was thus secured to the house of the Claudii. In the same year (A.D. 4) Tiberius was appointed commander-in-chief in Germany, and he was accompanied by the historian Velleius Paterculus, who was præfectus equitum. Paterculus gives a very favourable idea of his talents as a general, and of his conduct in the German wars.

Augustus died at Nola on his return from Naples, where he had accompanied Tiberius, who was going to conduct the war in Illyricum (29th of August, A.D. 14). Livia concealed the Emperor's death until Tiberius, who was informed of it by messengers, had arrived at Nola.

Tiberius became emperor in his fifty-fifth year. Until that time he was generally supposed to be a virtuous man; though his virtues were imbued with the severe gravity of his character. Among his biographers none has blamed his early life; yet no sooner was he emperor, than he was charged with crimes the most dreadful and disgusting.

Immediately upon the accession of Tiberius, Agrippa Postumus was put to death, probably by order of Tiberius. About this time the supreme power was offered by the troops on the Lower Rhine to Germanicus, who however refused it; and the mutiny was quelled by him and by Drusus, the son of Tiberius, who commanded in Pannonia. Tiberius abolished the comitia for the election of the various magistratus, and transferred the election to the senate. Augustus had already employed the Lex Julia Majestatis to punish the authors of libels against his person (Tacitus, 'Annal.,' i. 72); and his example was followed by Tiberius, who established the Judicia Majestatis, by which all those who were suspected of having impugned the majesty of the emperor, either by deeds or by words, were prosecuted with the utmost severity. The number of the delatores, or denouncers of such crimes, daily increased, and a secret police was established in Rome. In the meantime Germanicus, the favourite of the army, had avenged the defeat of Varus, but Tiberius recalled him from Germany, and sent him into the East (A.D. 17). Germanicus conquered Cilicia and Commagéne, and he renewed the alliance with the Parthians, but he died suddenly at Antioch (A.D. 19).

Sejanus succeeded in obtaining the confidence of the Emperor (A.D. 19–22), who henceforth gradually abandoned to him the direction of public affairs [SEJANUS]. In A.D. 26 Sejanus persuaded Tiberius to retire from administration. The Emperor finally fixed his residence in the island of Cápreæ, in the Gulf of Naples, where he indulged in his scandalous pleasures. On the 16th of of March, A.D. 37, he fell into a lethargy, and everybody believing him to be dead, Caligula, the third son of Germanicus, the favourite of old Tiberius, was proclaimed emperor. However Tiberius recovered, and Macro, in order to save himself and the new emperor, ordered him to be suffocated in his bed. Tiberius died at the age of 78, after a reign of twenty-three years. (Tacitus, 'Annal.'; Suetonius, 'Tiberius.')

TIBE'RIUS II., ANI'CIUS THRAX, FLA'VIUS CONSTANTI'NUS, was born in Thrace towards the middle of the sixth century A.D. He was educated at the court of Justinian, whose successor, Justin II. (565–578), employed him in various civil and military offices. In 573 Tiberius, who was then general of the imperial guards, commanded the army against the Avars, who were powerful north of the Save and the Danube. The favour of Justin, and the love of the Empress Sophia, elevated him to the rank of Cæsar A.D. 574. From this time the burden of administration devolved upon Tiberius. The most important event during the remainder of Justin's life was the war with Khosrew, the king of Persia.

On the 26th of September, 578, Justin abdicated, and Tiberius became emperor. In 579 Khosrew died, after having entered into negociations for peace with the Greeks, but his successor Hormedas renewed the war. The Greeks however had the advantage over the Persians; and the emperor was also successful in his wars in Africa. Tiberius was less fortunate in Europe,

the Avars having surprised and taken the town of Sirmium. But in the following year (581) Mauritius destroyed the Persian army in the plain of Constantine, and their general, Tam-Khosrew, lost his life. Mauritius had a triumph in Constantinople, and on the 5th of August he was created Cæsar by Tiberius, who was then worn out by illness, and who had no male issue. After having given his daughter, Constantina, in marriage to Mauritius, Tiberius died on the 14th of August, 582, and, since the time of the great Theodosius, no emperor's death caused regret so universal. It is a remarkable circumstance in the reign of this emperor, that he was always provided with money without oppressing the people by taxation; and yet his liberality was so great that the people used to say that he had an inexhaustible treasure.

TI'BET is the most southern of the three great table-lands of Middle Asia. The Bolor Mountains, a branch of the Hindu Kush, which stretches towards the north-west, in 72° 30′ E. long., form the western boundary. The length of this frontier is about 87 miles. It is bounded on the south-west by the Hindu Kush, from Mount Tutukan Mutlami and the north-western part of the Himalaya as far as the western frontier of Nepaul, a distance of about 480 miles. The southern boundaries are formed by the range of the Himalaya from the western frontier of Nepaul to the eastern frontier of Bootan, a distance of about 740 miles, and by the northern boundaries of Asam, Birma, and part of the Chinese province of Yunnan—together about 1540 miles. The eastern frontier is formed by the western boundaries of the Chinese provinces of Sütchuang (Setchuen), Shensi, and Kansu, about 900 miles. The northern frontier, which is very little known, is about 1300 miles in extent. Thus Tibet is bounded on the W. by Independent Turkistan; on the S.W. and S. by the Panjab, Hindustan, Nepaul, Bootan, and Asam; on the S.E. by Asam and China; on the E. by China; and on the N. by the desert of Gobi and Chinese Turkistan.

Physical Features.—Tibet is a table-land, the highest plains of which are more than 10,000 feet above the level of the sea. This table-land is divided into three great and distinct parts. The first, which is long, and not very wide, begins in the E., near Mount Kailasa, in the Himalaya, and stretches to the N.W., between parts of the Himalaya and of the Hindu Kush in the S.W., and the range of the mountains of Kárákorum in the N.E. It is traversed in its whole length by the upper part of the Indus. Its lower or north-western part, Balti or Baltistan, is also called the First Tibet, or Little Tibet, and is an independent state. Its upper or south-eastern part has the name of Ladakh, and is also called the Second Tibet, or Great Tibet, because it is larger than Baltistan. Sometimes the name of Little Tibet is given to the whole valley of the Indus. Ladakh is also an independent state, but the most eastern part of it, as far as Teshigang on the Indus, belongs to China. The second great division of Tibet begins in the south, near Mount Kailasa, and is an immense elevated desert, the western part of which is called Khor, and the eastern part Katchi. The third great division of Tibet contains the remainder of this country, which lies E. and S. of Khor and Katchi. The second and third natural divisions have the common name of Eastern or Third Tibet, or Tibet in the proper sense of the word. Eastern Tibet is subject to China. Third Tibet is traversed by numerous ranges of lofty mountains, the direction of which is from W. to E. and from N.W. to S.E. From these ranges lateral branches run out in different directions, and contain deep valleys between them. In proportion as the principal chains advance towards the S.E. they converge towards one another, and thus the valleys between them gradually become narrower, until at last, on the frontiers of Yunnan and Birma, they are mere mountain-passes.

The chief river is the Dzangbo, which flows in an E.S.E. direction, through the whole of southern Tibet, a distance of about 700 miles, and waters the provinces of Ngari, Dzang, and Wei. It has many large tributaries. Two other great rivers are the Gakbo-dzangbo-tsu and the Om-tsu. The Lang-tsang-Kiang traverses almost the whole extent of Eastern Tibet, from N.W. to S.E., and flows into the Chinese Sea in 10° N. lat., after a course of more than 1700 miles. The sources of the Kincha-Kiang, or Yang-tse-Kiang, which traverses China from W. to E., is situated between 37° and 38° N. lat., and between 89° and 92° E. long., on the table-land towards the north-western frontiers of Eastern Tibet. The Ya-long-Kiang is an important tributary of the Kincha-Kiang. The Hoang-Ho, or Yellow River, has its sources and a part of its upper course in Tibet.

The Tengri-Nor, the largest lake of Tibet, is surrounded by high mountains and rocks covered with snow and ice. The lake of Palte resembles a large ditch surrounding an extensive island which fills up the middle of the lake. In the extreme north of Tibet is situated the lake Khu-Khu-Nor, or Köke-Nor, that is, 'the Blue or the Celestial Lake,' which name has been given to all the surrounding country. The lakes of Kailasa are in the southern part of Tibet.

Tibet is known in India and China as a country of hunger and misery. However cold and barren the table-lands and the mountains may be, on account of their extreme elevation, and of the snow, which perpetually covers whole tracts, the climate of the valleys, and especially of the valley of the Dzangbo, is hot. The air is excessively dry, and its effects resemble those of the dry heat of the Sahara. The trees wither; their leaves may be ground to powder between the fingers; planks and beams break, and the inhabitants cover the timbers of their houses with wet towels in order to preserve them against the destructive effects of excessive dryness. The timber never rots. The flesh of sheep exposed to the open air becomes dry, and may be ground like bread, and thus preserved during years. This flesh-bread is a very common food in Tibet.

Productions.—Among the minerals there are gold, silver, copper, tin; salt, which is taken from the salt-lakes of Jayek and Deng-tsavga; corundum

stone, lapis lazuli, turquois, and agate. Besides a great number of grasses which are common in Europe, Tibet produces a kind of barley, grapes, assafœtida, rhubarb, madder, safflower, apples, nuts, apricots, peaches, pomegranates, and figs, in the valleys. The cedar grows in Tibet. Among the animals there are wild oxen with long hair, buffaloes, the buffalo which is called the yak, goats with a very fine fleece, goats with long fine hair, silk-worms, wild cats, tigers, leopards, lynxes, argali with horns of 100 lbs. weight, pigs, white eagles, and swans. All our domestic animals are known in Tibet, and the horses are excellent. Fish are abundant in the rivers, but they are not eaten, being prohibited by the religion of Buddha.

Political Division.—Tibet is divided into the two territories of the Dalai-Lama and the Teshu-Lama; the former of which contains the eastern and north-eastern parts of Tibet, while the latter contains all the rest. The chief town is H'Lassa, or Lassa, situated in a beautiful plain on the banks of the Dzang-tsu, about 12 leagues from its junction with the Dzangbo. It is a populous and very commercial town, and distinguished by many fine public buildings, especially convents, among which there is the first temple of the Buddhists. The town has walls and 5 fortified gates. In the neighbourhood of the town are four magnificent convents, the largest among the 3000 convents of Tibet, a great number of which contain several thousand monks. The residence of the Dalai-Lama is in the convent of Pobrang-Marbu (the red town) on Mount Botala, north-west of H'Lassa, and is said to be a building of immense extent. Teshu-H'Lumbu contains from 300 to 400 houses, convents, temples, and palaces, which are surrounded by a wall, and all communicate with each other. The chief building, where the Lama resides, has the name of Lapranga, the most remarkable part of which is the mausoleum of the Teshu-Lama who died in Peking in 1781. This mausoleum, of which Turner gives a careful description, has a most beautiful appearance, and is a fine specimen of Tibetan sculpture. It is said that 3700 Gylongs or monks are daily occupied in the performance of their various religious duties in the palace of Teshu-H'Lumbu. Of the other towns of Tibet we have but little information.

Inhabitants and History.—The first accounts of the history of Tibet are in the annals of the Mongols and of the Chinese. The Tibetans belong to the Mongol race: they were at first divided into many independent tribes which led a nomadic life; but they were united to form a kingdom about 313 B.C. Buddhism was introduced in A.D. 407. H'Lassa was built about 650 by Srongdsan-Gambo, who seems to have been the most famous of the Tibetan kings.

In the beginning of the 11th century each of the seven grandsons of King Bilamgur-Dzang became an independent prince; and from this event dates the entire decline of the kingdom of Tibet, the power of which had been already broken by civil troubles. One of the new kingdoms was Tangut, in the northern part of Tibet. Tibet was conquered and ravaged by Genghis Khan, and it was not before the end of the 13th century that the country recovered from the calamity of the Mongol war by the careful administration of Khublai-Khan. China gradually conquered the eastern provinces; and since the year 1720 all Tibet has been a vassal state of China. Chinese garrisons are in its towns, and they watch the passes in the frontier mountains. The national government of Tibet is supported by a perfectly organised hierarchy. The name of the chief priests is Lama; and the Dalai-Lama is the first of them. The second is the Teshu, or Bogdo-Lama. The people are kind, tolerant, polite, and much more civilised than the Mongols, although they are generally poor. They live in a state of polyandry, that is, several men cohabit with one woman; but it is only brothers who are allowed thus to have one woman in common. Arts and literature are cultivated, but the works and the language of the Tibetans are almost unknown in Europe. Both the Lamas are absolute princes in religious matters, but their sovereignty is checked by the authority of the emperor of China.

(Ritter; Klaproth; Abel Remusat; Kircher; Senang Setsen, *History of the Mongols;* Turner, *Embassy to the Court of Teshoo Lama in Tibet*; Moorcroft in *Asiat. Journ.*, 1826).

TIBULLUS, A'LBIUS, lived in the time of Augustus, and was a friend and contemporary of Horace. The time of his birth is uncertain. He was of equestrian rank, and originally possessed considerable property, of which he lost the greater part, probably in consequence of the assignments of lands among the veterans of Augustus. He was not however reduced to poverty. The estate on which he resided at Pedum, a town between Præneste and Tibur, appears to have been his own. Here he passed the greater part of his time in the enjoyment of a quiet country-life. He left it however to accompany his patron, Valerius Messalla, into Aquitania, and was present with him through the campaign, either in B.C. 28 or 27. (Tibull., i. 7, 9.) Tibullus died soon after Virgil; and as Virgil died in B.C. 19, we may perhaps place the death of Tibullus in B.C. 18.

There are thirty-six poems of Tibullus extant, all written in the elegiac metre, except one, and divided into four books. The first poem in the fourth book is written in hexameters, and is supposed not to be by Tibullus. His elegies are chiefly of the amatory kind. A few are in praise of his patron Messalla, but they are not his best specimens. Quintilian places Tibullus at the head of the Roman elegiac poets. His poems are characterised by great tenderness, but there is a tone of melancholy about them, and his enjoyment of the present appears to have been interrupted by dark forebodings of the future. His simple style forms a contrast to the artificial manner of Propertius.

There are numerous editions of Tibullus. Those of Lachmann, Berlin, 1829, and of Dissen, Göttingen, 1835, are the latest. Tibullus was translated into English by Dart (1720) and by Grainger (1759).

TIC DOULOUREUX. [NEURALGIA.]

TICI'NO (*Tessin*), a Swiss canton situated on the Italian slope of the Alps, takes its name from the river Ticino, which has its source in the St. Gothard, flows southward along the Val Levantina,

passes Bellinzona, and enters the Lago Maggiore at its northern extremity. The canton is very mountainous, being intersected by several offsets from the great chain of the Lepontine and Rhætian Alps. [SWITZERLAND.] A number of valleys lie between these offsets, sloping generally towards the south. A ridge called Monte Cenere runs across the southern part of the canton from the Iöri Berg, to the east bank of the Lago Maggiore. South of this ridge lies the basin of the lake of Lugano. The *lake of Lugano*, called also Ceresio, lies within the territory of the canton, with the exception of its north-eastern extremity, which stretches into Austrian Lombardy. Its form is very irregular: its length is about 20 miles, but its breadth is little more than a mile, except in front of the town of Lugano, where it is about two miles wide: the surface is about 800 feet above the sea, and the greatest depth is 500 feet. A number of trading-boats ply on the lake. Its outlet is formed by the Tresa, which runs into the Lago Maggiore. The lake of Lugano separates the southern part of the canton, consisting of the districts of Mendrisio and Ceresio, from the rest of the canton, which lies north of the lake.

The canton is bounded N. by Uri, Valais, and the Grisons; E. by the Grisons and the Austrian province of Como; S. by the province of Milan; and W. by Sardinia. The surface may be divided into five regions:—1. The region of the vine, the fig, and the peach, which includes the lower valleys and hills, and extends to the height of 2400 feet above the Lago Maggiore. The olive, orange, and lemon-trees thrive in some favoured spots. 2. The region of the chestnut, the pear, the apple, and cherry-tree, which rises about 1000 feet higher. 3. The region of the fir-tree, which rises to about 4500 feet above the level of the lake. 4. The Alpine pastures, which reach as high as 6000 feet. 5. The region of perpetual snow, which includes several Alpine summits between 8000 and 9000 feet high. There is consequently a great variety of climate as well as of productions in the canton. Horned cattle, sheep, goats, and pigs, are numerous. The number of horses and mules is small. Wolves and bears are hunted in the mountains. The rivers and lakes abound in fish. The principal articles of export are cattle, cheese, wine, fruits, hay, hides, and marble from the numerous quarries. Corn is imported from Lombardy. The manufactures consist chiefly of coarse cloth, leather, straw-plait, and tobacco. The silkworm is reared in some localities.

The population of Ticino, which is entirely Catholic, amounted in 1850 to 123,153. The area is 1033 square miles. The language is a dialect of Italian. Several thousand people emigrate every year to work in other countries, as masons, porters, glaziers, chocolate-makers, and sellers of barometers.

The principal town, *Lugano*, a pretty thriving place on the north-west bank of the lake of Lugano, has some fine churches, and large mansions, an hospital, a theatre, a college, manufactories of silk, paper, tobacco, and leather, iron and copper foundries, and 4500 inhabitants. The country around Lugano is planted with vines, olives, and other southern trees, and abounds with country-houses. *Bellinzona*, a walled town situated in the valley of the Ticino, on the high road of the St. Gothard, has a very fine church, a college, an arsenal, and about 1500 inhabitants. There are several ruined feudal castles in the neighbourhood. *Locarno*, a small town with a fort on the Lago Maggiore, in a romantic situation, has a handsome church, a castle, which is now the government-house, and about 1700 inhabitants. *Mendrisio*, a town of 1700 inhabitants, in a fertile country, and on the road to Como, has a college, and some silk manufactories.

TICKELL, THOMAS, an English poet, was born in 1686, at Bridekirk in Cumberland. He was sent to Queen's College, Oxford, and proceeded M.A. in 1708. Two years afterwards he was chosen fellow of his college, which he vacated by marrying in 1726.

When Queen Anne was negociating with France, Tickell published 'The Prospect of Peace,' which, owing perhaps to Addison's friendly praises of it in 'The Spectator,' had a rapid sale. On the arrival of King George I. Tickell wrote 'The Royal Progress,' which was printed in 'The Spectator.' The translation of the first book of the 'Iliad' was the most important thing in Tickell's poetical career, having been published in opposition to Pope's. Johnson says, 'To compare the two translations would be tedious; the palm is now universally given to Pope. But I think the first lines of Tickell's were rather to be preferred.' During the dispute on the Hanoverian succession Tickel assisted the royal cause with his 'Letter to Avignon,' of which five editions were sold. Addison now employed him in public business, and when, in 1717, he himself rose to be secretary of state, he made Tickell under secretary. On Addison's death, Tickell published his works, to which he prefixed an elegy on the author, which Johnson pronounces to be equal to any funeral poem for sublimity and elegance in the English language, which is, to say the least, exaggerated praise. Tickell has smoothness and fluency, but very little of poetic genius.

In 1725 Tickell was made secretary to the Lords Justices of Ireland, a place of honour in which he continued till his death, April 23, 1740.

TICKHILL. [YORKSHIRE.]

TICO'REA, a genus of plants belonging to the natural order *Rutaceæ*. *T. jasminiflora* is a shrub from seven to eight feet high, a native of Rio Janeiro. *T. febrifuga* differs but little in its character from the last species. The bark is intensely bitter, astringent, and is regarded as a febrifuge.

TIDEMAN, PHILIP, was born at Nürnberg, in 1657. He studied for 8 years under a painter named Nicholas Raes, and then went to Amsterdam, where he placed himself under Lairesse. He soon acquired the affection of his master, whom he assisted in his compositions, and was not long before he gained abundant employment for himself.

His compositions of fabulous history and allegory indicate a lively fancy, genius, and invention. Two of his capital compositions were Venus com-

plaining to Jupiter of Juno's persecution of Æneas, and Juno applying to Æolus to destroy the Trojan fleet. He died in 1715.

TIDES. [Waves and Tides.]

TIDESWELL. [Derbyshire.]

TIDOR, or TIDORE. [Molucca Isles.]

TIEDEMANN, DIETRICH, was born the 3rd of April, 1748, at Bremervörde, near Bremen, where his father was burgomaster. His father sent him in 1763 to Verden, where he acquired a knowledge of the ancient and some modern languages. After a stay of two years there he entered the Athenæum of Bremen. It was here that he conceived a love for philosophy and its history, and he began his philosophical studies by reading the works of Descartes, Locke, Helvetius, and Malebranche. At the university of Göttingen he continued the study of classical literature, mathematics, and philosophy. In 1769 he took the situtation of tutor in a nobleman's family in Livonia, in which he remained four years. Here he found time to write a little work on the origin of language, which was published at Riga in 1772. On returning to Göttingen, his friend Meiners, who was now a professor in the university, introduced him to Heyne, who made him a member of the philological seminary. The small income derived from this institution and from private instruction, together with what he got by writing, enabled him to live in independence. In 1776 he was appointed to the professorship of ancient literature at the Carolinum in Cassel. In 1786, when the Carolinum was broken up, Tiedemann was transferred with the other professors to Marburg. Here he lectured at different times on logic, metaphysics, the law of nature, on moral philosophy, psychology, universal history, history of philosophy, and sometimes also on some classical Greek writer. His lectures were very popular, and his kind disposition made his hearers look upon him more as a friend than as a master. He died on the 24th of May, 1803. A list of some of the works of Tiedemann is given in the 'Penny Cyclopædia.'

TIEDGE, CHRISTOPH AUGUST, was born at Gardelegen in Altmark, Dec. 14, 1752. He completed his legal studies at Halle; but soon abandoned his intended profession, and in 1776 became private teacher in the Arnstadt family at Elrich in Hohenstein. On quitting Elrich he was invited by Gleim (with whom, as well as other literary men, he had become acquainted) to reside with him at Halberstadt, which he did until 1792, when he became private secretary to Domherr von Stedern, and in that family he continued until 1799, when, on the deaths of Von Stedern and his wife, Tiedge was left a handsome competency. Being thus at ease in his circumstances, he visited Berlin, where he renewed an acquaintance with the Baroness von der Recke, and the intimacy continued for life. This union, of a kind so exceedingly rare that no name has been invented for it, was that of two noble and pure minds, congenial in their tastes, and equally inspired with a feeling for poetry and those pursuits which, while they refine, also elevate our nature. The author of 'Urania' was as well shielded from scandal as was the author of the 'Task;' for the first-mentioned poem is, like the other, deeply tinged by religious sentiment. Its merits were immediately recognised, and it went through several editions within a short time from its first appearance in 1801.

In 1804 Tiedge and his female friend visited Italy, and of this journey we have an account from Madame von der Recke herself, 'Tagebuch einer Reise,' &c., 4 vols. 8vo., which affords evidence of her being a woman of strict piety. On their return to Germany, Madame von der Recke made Berlin, and afterwards (1819) Dresden, her chief place of residence. The only change Tiedge henceforth experienced was that occasioned by the loss of his companion and benefactress in 1833. Tiedge not only attained an unusual age, but was remarkably free from all infirmities of either body or mind. He died March 8, 1841.

Soon after his death his 'Life and Literary Remains were given to the world by Dr. F. Falkenstein, in 4 vols.; followed by an edition of all his works, 10 vols. After his 'Urania,' his most original production is perhaps his 'Wanderungen durch den Markt des Lebens,' 1836. His principal other productions are his 'Poetical Epistles,' his 'Elegies,' and his 'Frauenspiegel.'

TIE'POLO, GIOVANNI BATTISTA, was born at Venice in 1693. Tiepolo, says Lanzi, was the last painter of the Venetian school who acquired a European fame. He studied under Gregorio Lazzarini, but adopted eventually the style of Paul Veronese. His works in the north of Italy, both in oil and in fresco, are numerous: one was the Shipwreck of San Satiro, in the church of St. Ambrose, at Milan; another, in oil, is the Martyrdom of St. Agatha, in the church of St. Antonio at Padua. In Germany also Tiepolo executed several works: at Würzburg he painted the staircase and the saloon of the bishop's palace and two altar-pieces. He was afterwards invited by Charles III. to Spain, where, in Madrid, he painted the ceiling of the saloon in the new palace of the king, and the hall of the royal guard; he executed also an altar-piece in oil for the church of St. Paschal, at Aranjuez. He died in Madrid in 1769 or 1770.

TIFLIS, or TEFLIS, the capital of the Russian province of Georgia, is situated nearly midway between the Black Sea and the Caspian, in about 41° 41′ N. lat., 44° 56′ E. long., on the Kur, at the southern extremity of a gloomy defile formed by high, dark, and barren hills. The larger portion of the town is built on the right bank of the river, and contains the houses of the wealthiest inhabitants, the great bazar, the principal squares, the finest churches, the public offices, the residence of the military governor, and of the commander-in-chief. This is the city properly so called, which again is divided into two parts, the old and new town. The limits of the old town, which was formerly noted for its dark and very narrow streets, but has been much improved since its occupation by the Russians in 1801, are distinctly marked by the ruins of the ancient fortifications. The new town extends to the north and west beyond these walls, and is distinguished from the old town by its new buildings

in the European style and by its broader streets. On the left bank is the extensive suburb Awlabar, a large caravanserai, the barracks, a long row of houses inhabited by colonists from southern Germany, the fortress or citadel, built by the Turks in 1576, and several ancient ruins. There are in Tiflis 15 Greek churches, 20 Armenian, and 2 Roman Catholic, some of which are very handsome. At a point where the river in its course through the town is hemmed in by rocks, a bridge of a single arch connects the town with the suburb of Awlabar. This bridge is 1100 feet above the level of the Black Sea.

Tiflis has been chiefly indebted for its celebrity to its warm baths. The mineral springs rise in considerable numbers at the south end of the city, between the strata of limestone, whence they are conducted into a cavern excavated in the solid rock, divided into different apartments for men and women, into which not a ray of daylight is admitted, and which are merely rescued from total darkness by the faint glimmerings of a few twinkling lamps struggling with the vapour arising from the water. The temperature of the coldest of these springs is 79.5° Fahr., of the hottest 124.5° Fahr.

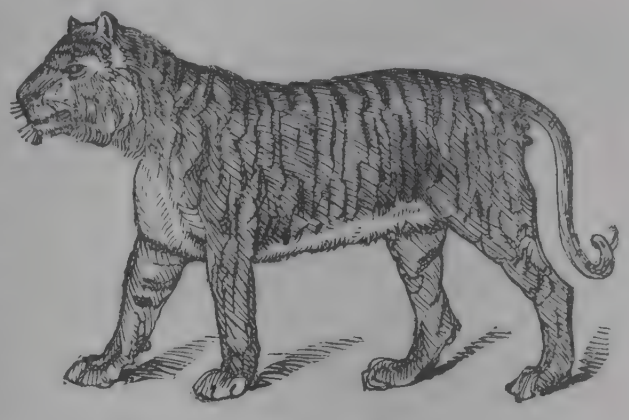
The population in 1820 was stated at 15,000; it is now nearly 45,000, half of whom are Armenians, the remainder Georgians, Roman Catholics, and Mohammedans. Tiflis is the residence of a Georgian patriarch, a Georgian metropolitan, and an Armenian archbishop. There are some manufactories of woollen, cotton, and silk.

Tiflis is most favourably situated to be the medium of an extensive transit trade between Europe and Asia; the rich Armenian bankers and merchants of the town have the chief direction of this trade, which however is now carried on mainly through the Turkish port of Trebizond, and thence by caravans to Persia and Bushire. Recent relaxations in the Russian tariff on goods in transit are likely however to turn the course of this trade again through the Georgian port of Redout-Kalé, Tiflis, and the Caspian. The enterprising Armenians of Tiflis trade entensively with Odessa, Trieste, Leipzig, Nishnei-Novgorod, Persia, Bokhara, Thibet, and Cashmere.

(Sir Robert Ker Porter, *Travels in Georgia, &c.*; *Lettres sur le Caucase et la Géorgie*, 1812; Klaproth, *Reise in dem Caucasus und Georgie;* Parrot, *Reise zum Ararat*, Berlin, 1834; Eichwald, *Reise in dem Kaukasus*, Stuttgard, 1837.)

TIGERS. [Felidæ; Leopards; Lions; Lynxes.] The true or Royal Tiger, which equals the lion in size, and is beautifully striped with black on a rich orange-yellow ground, needs no specific description. It is a native of India and the Indian islands, as Sumatra, &c. In ancient times its range of territory extended more to the north and west (even to the borders of Europe) than at present, for the ancients apply to this animal the epithet Hyrcanian (Hyrcania being a country to the south of the Caspian Sea). Indeed Pennant gives Mount Ararat as one of its localities; but we have not heard of any specimens being brought from that mountain-region, although Tournefort saw numbers of these animals in the middle region, and even as far up as the borders of the snow-line. He adds that the young ones are caught in traps, and exhibited throughout Persia.

The Tiger (*Felis Tigris*) was frequently exhibited in the Roman amphitheatre. Pliny well knew the distinction between this animal and the spotted leopards or panthers; nor are representations of it in mosaic wanting.



Royal Tiger (*Felis Tigris*).

The ferocity of the tiger is proverbial. He bounds upon his prey with prodigious force, clearing in his deadly leap a distance scarcely credible. Man is a mere puppet in his gripe; and the Indian buffalo is not only borne down by the ferocious beast, but carried off by his enormous strength. If he fails, it has been said that he makes off. This may be true in certain instances, but in general he does not slink away, but pursues the affrighted prey with a speedy activity which is seldom exerted in vain. In Sumatra the natives are so infatuated that they seldom kill them, having a notion that they are animated by the souls of their ancestors. They are the scourge of the country; they lurk among the bushes on the sides of rivers, and almost depopulate many places. They are insidious, blood-thirsty, and malevolent, and seem to prefer preying on the human race. Hindustan may be considered the head-quarters of this destructive animal; there it is that he reigns unawed even by the lion, with which he disputes the mastery, and which is comparatively rare in that peninsula. Tiger-hunting is a favourite diversion in India, not always unattended by fatal accidents.

The tiger swims well, but does not climb trees. The female brings forth from three to five cubs at a time, and while nursing them is doubly dangerous, furiously attacking man or beast that ventures near her lair.

When taken young the tiger is easily tamed, but as its temper is apt to break out on slight occasions, it is not to be incautiously trusted. The tame tigers of the mendicant priests or Fakirs of Hindustan are well known.

Hybrids have been produced in captivity between the tigress and lion.

Fossil Tigers.—Professor Buckland notices the remains of a large *Felis* or Tiger, in the cave at Kirkdale, at Plymouth, and in the breccia of Antibes. To this great fossil Felis (*F. spelæa*) other extinct Cats of a former epoch may be added.

As examples of those feline animals which are popularly termed Tiger-Cats, and in which a

tigerine character predominates, we may adduce the *Felis Nepalensis* of Horsfield, and the *Felis Javanensis* of the same author, the former from the Nepaul range, the latter from Java; *Felis Marmorata*, Martin, from India; *Felis Bengalensis*, &c.

The African Tiger-Cats are represented by the Serval (*Felis Serval*); and those of America by

The Serval (*Felis Serval*).

The Ocelot (*Felis pardalis*), the Chati (*Felis mitis*,

The Chati (*Felis mitis*).

F. Cuv.), the Pampas Cat or Pajero (*Felis Pajeros*), and the Margay (*Felis tigrina*). All these smaller feline animals feed upon birds and quadrupeds, proportionate to the development of their destructive powers.

TIGRA'NES, king of Armenia, the ally of Mithridátes the Great, who gave him his daughter Cleopatra in marriage. He was master of the large tract between Egypt in the S.W. and the Caspian Sea in the N.E., which was bounded by Assyria and Media on the E., and by the kingdoms of Pontus and of Cappadocia on the W. and N.W. The early history of Tigranes is little known. He conquered Gordyene and Mesopotamia, and the Syrians chose him for their king in B.C. 84, or according to Appian in B.C. 80. Before B.C. 74 he concluded an alliance with Mithridates, who was then about to begin his third war with the Romans. The campaign was opened in B.C. 74. Cappadocia and Bithynia were conquered, and Mithridates laid siege to Cyzicus in Bithynia, but Lucullus came to relieve it, and after various reverses Mithridates was compelled to fly to Tigranes (B.C. 69). The Armenian king not only refused to receive his father-in-law, but set a price of a hundred talents on his head. Mithridates nevertheless succeeded in pacifying his son-in-law, and they joined their armies to meet Lucullus, who laid siege to Tigranocerta, the new capital of the Armenian kingdom. A battle ensued near this town, in which Tigranes was completely defeated, and his capital fell into the hands of the Romans. Tigranes and Mithridates having entered into negociations with Phraátes III., king of the Parthians, for the purpose of drawing him into their alliance, Lucullus marched to Mesopotamia to attack the Parthians. But a mutiny of his soldiers compelled him to retreat to Cappadocia, where they dispersed. The Romans lost Cappadocia, and Tigranes carried off a great number of the inhabitants of this province. Cn. Pompeius entered Asia Minor in B.C. 66, and in the same year he defeated Mithridates in a great battle on the Euphrates, upon which Tigranes submitted to Pompeius, and knelt before him. Tigranes was reinstated in Armenia, except the districts of Gordyene and that of Sophene, or the westernmost part of Armenia Magna, which he was obliged to cede to his rebellious son Tigranes, then an ally of the Romans. He also ceded to the Romans his kingdom of Syria, including Phœnicia and all his conquests in Cilicia, Galatia, and Cappadocia. He paid six thousand talents, and he gave half a mina to each Roman soldier, ten minæ to each centurion, and sixty minæ, or one talent, to each tribune. After this nothing more is known of Tigranes.

TIGRANO'CERTA, for some time the capital of Armenia, was built by King Tigranes after he had extended his dominion over Mesopotamia, Syria, and Phœnicia. Artáxata, the old capital on the Araxes, was situated in the north and the neighbourhood of the Caucasian nations, then the allies of Armenia. At the time of the foundation of Tigranocerta (between 84 and 74 B.C., but nearer to 84) the Romans were at war with Mithridates, the neighbour and ally of Tigranes. Tigranocerta was situated a short distance from the Upper Tigris, on the Nicephorius, a river of considerable breadth. Seert or Sered, a small town, surrounded by ancient ruins, is generally supposed to be on the site of Tigranocerta. Sered is situated on the banks of a small river, which flows into another river of considerable length, the Bedlis of Hájí Khalfah, which has its sources south-east of lake Van, and flows into the Tigris.

TIGRÉ. [ABYSSINIA.]

TIGRIS. The northern shore of the Persian Gulf extends from 48° E. long. to 50° 9′, nearly in a straight line from east to west. Along this line the waters of the Euphrates, Tigris, Kerkhah, Karun, and Jerahi, enter the sea. The largest diameter of the drainage-basin of the Tigris and Euphrates extends from about 30° N. lat. and 49° E. long. to about 40° N. lat. and 41½° E. long. Within this basin a great plain extends in a north-east direction from the sea. To the north-east of this central plain is the declivity of the high table-land of Persia; to the north-west the declivity of the high table-land of Armenia and Asia Minor; to the south-west the declivity of the great Syrian desert and the northern districts of Arabia.

The principal rivers which descend the north-west and north-east sides of the basin are

—1, the Euphrates and its affluents; 2, the Tigris, and those affluents which join it before it enters the plain; 3, the Diyalah and its affluents; 4, the Kerkhah and its affluents; 5, the Karun and its affluents; 6, the Jerahi and its affluents.

The *Euphrates* is formed by the confluence (about 39° N. lat., 39° E. long.) of two rivers, the Murad-chai and the Kara-su. The former of these rises near the mountains which encircle lake Van; the Kara-su rises near Erzerum; and both flow through very hilly regions. Their point of junction is about 4000 feet above the level of the sea. At a few miles below the junction the Euphrates precipitates itself through a gap in the mountains which extend from east to west between the Murad-chai and the Upper Tigris. In this part of its course the stream is hemmed in by lofty precipices and interrupted by rocks and small rapids, but warlike stores have been floated downwards on rafts. From Someisat (the ancient Samósata) the Euphrates is navigable without serious interruption to the sea. On the east bank, and nearly opposite (37° N. lat., 37° 58′ E. long.), is Port William, the station of the Euphrates expedition under Colonel Chesney. The Tigris steamer ascended the river as high as Bir. About the 37th degree of N. lat., and between the 40th and the 42nd degree of E. long., is a range of heights (some of them 2500 feet above the sea) which extend from the Euphrates at Someisat to the Tigris north of Mosul, and form the southern boundary of the upper valley of the latter river. About 100 miles below Anah the Euphrates passes Hit, well known for its bituminous fountains, which are mentioned by Herodotus (i. 178) under the name of Is. Seventy miles below Hit, at the mouth of the Saklawiyah Canal, it has entered the great central plain. The Euphrates terminates by a junction with the Tigris at Kurnah, about 31° N. lat., 47° E. long. It receives the waters of a vast number of rivers on both banks.

The Tigris.—The principal source of this river is at an elevation of nearly 5000 feet above the sea-level, on the southern declivity of the mountain-range which forms the southern wall of the valley of the Murad-chai, between Mush and Alishan, and not much more than 10 miles distant from the most easterly point of the bend of the Euphrates, between Malatiyah and Someisat. Opposite Diar-Bekr the Tigris is about 250 yards wide in the season of floods, but it is only used to float timber-rafts from the mountains. The Tigris receives the large river Zab about 36° N. lat., 43° E. long.; and about 84 miles below this point, it forces its way through the Hamrin Hills, the south boundary of a plain extending from north-west to south-east, which is cut diagonally by the river in its course from Mosul. At about 34° N. lat., 44° E. long., the Tigris issues from the hills into the great central plain. Between Diar-Bekr and Mosul (296 miles) the river is navigable for rafts at certain seasons; below Mosul it is navigable throughout the year. In 1838 the 'Euphrates' steamer ascended it to within 20 miles of Mosul. The Tigris, like the Euphrates, receives a great number of tributary streams.

The Diyalah—This river, known in its upper course as the river of Shirwan, rises among the mountains, of which Mount Elwend, above Hamadan, is the best known if not the highest summit, about 34° 40′ N. lat., 47° 30′ E. long. It issues into the plain through a gap in the Hamrin Hills, which are here not more than 200 feet above its level. Close above the Hamrin Hills the Diyalah is, according to Rich, 400 yards broad, 'and the strong current rushes as from a sluice.'

The Kerkhah.—The main branch of this river rises on the south side of Mount Elwend, nearly in the same latitude with the Diyalah, about a degree to the eastward. At Pul-i-tang, the Kerkhah, in general about 80 or 100 yards in width, forces its way through a narrow chasm, which a bold sportsman can spring across with ease. The cleft is about 150 feet deep; the sides are honeycombed in the most fantastic manner; and the river boils and foams below in its narrow bed. About 40 miles below the ruins of Sus the river breaks through a low range of heights, and enters the great central plain about Hawiza.

The Kharun rises in 32° N. lat., 50° E. long., and after receiving many tributaries, enters the great plain near Hawaz.

The Jerahi is formed by the junction of the Zard with some other considerable torrents from the Mungasht hills, and is bounded by a mountain range, which terminates the drainage-basin of the Tigris and Euphrates on the south-east.

The declivity which forms the south-western boundary of the drainage-basin of the Tigris and Euphrates, from the base of the lofty mountains through which the latter river forces its way above Someisat, is very imperfectly known; and the little that is known of it leads to the belief that it is in the highest degree monotonous and uniform. The desert or great plains of Northern Syria, as this region is generally called, maintains an average elevation of 1300 feet.

We have traced the principal rivers into the great central plain, and have next to follow them to their termination in the Persian Gulf.

About 5 miles below Bagdad the Saklawiyah Canal, which springs from the Euphrates, joins the Tigris; the distance along this canal from river to river was found by Lieutenant Lynch (who sailed along it in 1838, in the Euphrates steamer) to be 45 miles. At 21 miles below the termination of the Saklawiyah, the Diyalah brings into the Tigris a large body of water. From the confluence of the Diyalah and Tigris the course of the latter is extremely winding, but its general direction is south-east. About 97½ miles in a straight line from Bagdad in that direction, it reaches Kut-el-amarah, a small town on its left bank, where it sends off a small branch to the Euphrates, while the main branch flows onward to the junction at Kurnah. The Euphrates, from the canal of Saklawiyah, flows S.E. to the Mounds of Mohammed: it is here only 18 miles distant from the Tigris at the mouth of the Saklawiyah; near this part are the remains of three ancient canals which formerly united the two rivers. From the Mounds of Mohammed the river flows across a flat barren country to Hillah,

50 or 60 miles distant from Bagdad. From Hillah to a bifurcation a short way above Lemlum, the volume of water in the Euphrates is materially diminished by canals of irrigation. At 57 miles from Karayem the Euphrates is joined by the Hai, the branch which diverges from the Tigris at Kut-el-amarah; and 78 miles farther on it receives at Kurnah the waters of the main branch. The distance (by water) from the remotest sources of the Tigris to Kurnah is about 1146 miles, little more than half the length of the Euphrates. The Euphrates and Tigris after this form one tidal channel, known by the name of the Shat-el-Arab, about half-a-mile wide. Five miles below Kurnah it is joined by the Kerkhah. From Kurnah to Basrah is 40 miles by the river, and thence to Mohammarah, where the Karun joins the Shat-el-Arab, 23 miles. Between Kurnah and Basrah the river has an average breadth of 600 yards, with a depth of 21 feet; between Basrah and Mohammarah, a breadth of 700 yards, and a depth of 30 feet. The current below Kurnah is two miles an hour during the flood and three during the ebb tide. Between Kurnah and Mohammarah the river forms five islands, all large.

Colonel Chesney, in his expedition to and on the Euphrates, succeeded in the course of the years 1835, 1836, and 1837, in running a line of levels from the Mediterranean to the Euphrates; collecting materials for a correct map of northern Syria; exploring northern Mesopotamia; surveying the Euphrates from Bir to the sea; exploring the Tigris for 400 miles above its junction with the Euphrates; exploring the great delta of Susiana; running a second line of levels from the Tigris to the Euphrates across the plain of Babylonia; and traversing the Syrian desert by several routes. Valuable observations, especially in the departments of zoology and geology, were made by the naturalists attached to the expedition.

TILBURG. [BRABANT, NORTH.]

TILBURY. [ESSEX.]

TILE, a kind of thin brick, or plate of baked clay, used chiefly for covering roofs, but occasionally for paving floors, constructing drains, &c. In the ancient buildings of Greece and Rome, tiles were made of various materials, among which were baked clay, marble, and bronze. They were made flat, or with a raised border along each edge, or semicircular on their lower edges.

The process of making tiles is so similar to that of brick-making [BRICK], that it will be sufficient to observe that only the best qualities of brick-earth are fit for the purpose. The roofing-tiles used in this country are chiefly of two sorts, *plane-tiles*, which are flat, of a rectangular form; and *pan-tiles*, which also have a rectangular outline, but are bent in such a manner that, when laid on the roof, the greater part of their surface forms a concave channel for the descent of water, while one side forms a narrow convex ridge, which overlaps the edge of the adjoining tile. Tiles of a semi-cylindrical form, laid in mortar with their convex or concave sides uppermost, respectively, are used for covering ridges and gutters. Drain-tiles are most commonly made in the form of an arch, and laid or bedded upon flat tiles called *soles*. Paving-tiles are usually square, and of greater thickness than those used for roofing.

TI'LIA, the name of a genus of plants belonging to the natural order *Tiliaceæ*. The trees in England are called *Lime-Trees*, in German and Dutch *Linden*. They are principally natives of Europe and America.

T. Europæa, the European or Common Lime-Tree, is abundant in the middle and north of Europe. It is very common in Great Britain, although some doubts have been expressed as to its being truly indigenous. It is however admitted into all British Floras; and there can be no doubt, from its wide diffusion, that it is truly naturalised in this country. It was well known to the ancients, and is spoken of by both Theophrastus and Pliny. The wood is in considerable request: it is white, close-grained, soft, light, and smooth, and is used by the cabinet-makers for a variety of purposes. It is easily worked, as well as durable, and on this account has been employed for carving. Most of the fine carvings in this country, as those at Windsor Castle, the library of Trinity College, Cambridge, and at Chatsworth, are of this wood. The fibres of the bark are tough, and ropes and mats are manufactured from them. They are employed for this purpose in many parts of England, but in Russia and Sweden this manufacture forms a considerable branch of commerce. The flowers secrete a large quantity of nectar, and exhale a delicious scent. On this account they are great favourites with bees, and when expanded they are constantly beset with these insects. The honey thus procured is in great repute, and has given celebrity to the honey of Kowno, on the Niemen, in Lithuania, a small town which is surrounded by a forest of lime-trees. It is chiefly used for making liqueurs. The seed of the lime-tree possesses a large quantity of albumen, which is nutritious and perfectly innocuous.

The lime-tree attains a great age; and many specimens celebrated for their age and size exist. At Neustadt, in Würtemberg, there is a prodigious lime-tree, which gives its name to the town, which is called Neustadt an der Linden. This tree is said by Evelyn to have had in his time a trunk above 27 feet in circumference, and the diameter of the space covered by its branches to have been 403 feet. He adds copies of many of the inscriptions on the columns, the oldest of which is dated 1550, and the column on which it is inscribed now supports one of the largest limbs, but was at a considerable distance from the tree 300 years ago. This tree is still in existence. There are many other very aged individuals in this country and on the Continent.

The European species are:—*T. microphylla*, Small-Leaved Lime, a native of subalpine districts in the north of Europe. In Great Britain it is common in the woods of Essex and Lincolnshire; and Mr. E. Forster thinks it probable that this is the only true British species. *T. rubra*, Red Lime, is a native of Taurida, and some few specimens are growing in England. The young branches are of a beautiful coral-red colour, thence it has been called *T. corallina*. *T. platyphylla*, Broad-Leaved Lime-Tree, is more common

than the other species in Switzerland and the south of Europe. There are several specimens of this tree in England and Scotland, but they can scarcely be said to be wild. *T. alba*, White Lime-Tree, is a native of the woods of Hungary, and is readily distinguished from the other species by the whiteness of its leaves, which becomes especially evident when ruffled by the slightest breeze. It was introduced into this country in 1767, and there are now existing several very fine specimens, one at Walton-on-Thames, 60 feet high, and a number at Highclere in Berkshire.

The American species are:—*T. glabra*, the Black Lime-Tree, is a native of North America, in Canada, and the northern United States; in the southern states it is only found at a considerable elevation on the Alleghany Mountains. In external character it very much resembles the European species; its flowers and leaves are however larger. *T. laxiflora*, the Loose-Flowered American Lime, is a native of America, from Maryland to Georgia. *T. pubescens*, the Pubescent American Lime, is a native of the southern parts of the United States, from Virginia to Georgia, where it is found principally on the banks of rivers. It is a much less vigorous tree than the last two, and has much smaller leaves and more slender branches. *T. heterophylla*, the White American Lime, is abundant in Maryland, Delaware, and the western states of America, and is found on the banks of the Susquehanna, Ohio, and Mississippi. The leaves and flowers of this species are larger than any other. It seldom attains a height of more than 40 feet in its native districts, and specimens in Europe do not exceed 20 feet. It is a handsome ornamental tree, and deserving of cultivation.

TILIACEÆ, a natural order of plants belonging to the syncarpous group of Polypetalous Dicotyledons. This order consists of trees or shrubs, seldom of herbaceous plants. The species, of which there are about two hundred and fifty, are arranged in thirty-two genera, and are generally diffused throughout the tropical and temperate parts of the globe.

Tiliaceæ possess no active properties; they abound in a mucilaginous wholesome juice. The fibres of the inner bark are very tough, and are used for a variety of economical purposes. [TILIA.] The wood is generally white, light, and tough; that of *Grewia elastica* is used for making bows in India. The Trincomalee-Wood used at Madras for making the Massoola boats is the produce of *Berrya Ammonilla*. The *Corchorus olitorius* is cultivated in Egypt for use as a pot-herb.

TILLANDSIA, the name of a genus of plants belonging to the natural order *Bromeliaceæ*. Most of the species are parasitical, and are natives of America and the West Indies. *T. utriculata*, the Wild Pine of the colonists of Jamaica, is found growing on old and decaying trees in the forests of Jamaica. The stem is three or four feet high and the leaves are a yard long, and placed within one another in such a way that the water which runs down them is retained in their expanded bases. The bases then swell out and form a reservoir or bottle, which, being contracted at the neck, prevents the heat of the sun from evaporating the water. These reservoirs will each hold about a quart of water, and during the dry season they are the resort of all kinds of animals for the sake of the water, and travellers are often able to obtain a supply of water from this source when all others fail. *T. usneoides*, the Long-Moss Tillandsia, is a native of the forests of North America, from Virginia to Florida, and also of the West India Islands and Brazil. The filamentous stems, when deprived of their bark, may be used for the same purposes as horse-hair, and are used in this manner in America. They are also in some places made into cordage. The only preparation they require previous to being used is being put into water for a fortnight or more, according to the temperature, when, on being taken out and dried, the bark easily separates from the fibres, and they are fit for use. *T. monostachya*, Single-Spiked Tillandsia, is a native of the West Indies. The leaves of this as well as most of the other species, serve as reservoirs for water. About thirty species have been enumerated by botanists. Most of them are inhabitants of South America, especially of Peru, and of the great forests of the Andes. Two or three of the species have been found in the southern states of North America.

TILLEMONT, SEBASTIEN LENAIN DE, was born Nov. 30, 1637, at Paris, where his father was Maître des Requêtes. When between nine and ten years of age he was placed under the charge of the religious society then established in the vacant abbey of Port Royal, where he devoted himself to the exercises of learning and piety. At the age of 23 he entered the episcopal seminary of Beauvais, where he remained three or four years, and then spent five or six with Godefroi Hermant, canon of that city. He then returned to Paris, where he remained two years; after which he withdrew to St. Lambert, a country parish near that city. In Sept., 1672, he became subdeacon; fifteen months afterwards deacon; and in 1676 he received priest's orders. It was through the persuasions of his friend Isaac de Sacy that he was induced to take this step, for in his humility he deemed himself unworthy of the office. In 1681 he visited Flanders and Holland; and in 1682 undertook the charge of the parish of St. Lambert, but soon gave it up at the desire of his father. The first volume of his great work on ecclesiastical history appeared in 1690, and was received with general approbation. He had been obliged to alter the plan of his work and postpone the theological portion, owing to some frivolous objections made by the censor; but the obstacle was removed, and he brought out the first volume in 1693, under the title of 'Mémoires pour servir à l'Histoire Ecclésiastique des Six Premiers Siècles.' Tillemont died at Paris, Jan. 10, 1698.

The principal works of Tillemont are his 'Histoire des Empereurs,' a very useful work, and his 'Mémoires pour servir à l'Histoire Ecclésiastique.' The first was published in 6 vols. 4to.; the first four during the author's life, at intervals from 1690 to 1697; the remaining two after his death, in 1701 and 1738. The 'Mémoires,' &c., extend to 16 vols.

4to., of which the first appeared in 1693, and the fifth was in the press at the time of his death. These five volumes came to a second edition in 1701–2, and were followed in 1702–1711 by the remaining eleven, which the author had left in manuscript.

TILLOCH, ALEXANDER, was born Feb. 28, 1759, at Glasgow, where his father was a tobacconist. The son, though initiated into business, was more inclined to the pursuit of scientific knowledge, and one of the earliest subjects to which he applied himself was the improvement of the art of printing. [STEREOTYPE.] After carrying on the tobacco trade for a time in his native city, Tilloch abandoned it, and for several years exercised that of printing, either singly or in partnership with others. In 1787 he removed to London, and in 1789, in connection with other parties, purchased the 'Star,' a daily evening newspaper, of which he continued editor until within a few years of his death. For many years he devoted attention to means for the prevention of the forgery of bank-notes, but his proposals were neglected by the English government, and his negociations with the French government, who were anxious to avail themselves of his talents, were stopped by the Treasonable Correspondence Bill. In June, 1797, Tilloch published the first number of the 'Philosophical Magazine,' of which work he was sole proprietor and editor until a few years before his death. A volume of essays on the Prophecies, which Tilloch had written in the 'Star,' was published under the name of 'Biblicus;' and in 1823 an octavo volume entitled 'Dissertations introductory to the study and right understanding of the language, structure, and contents of the Apocalypse.' The last work undertaken by Tilloch was a weekly periodical entitled the 'Mechanic's Oracle.' The first number appeared in July, 1824, and it was discontinued after his death, which took place Jan. 26, 1825.

TILLOTSON, JOHN, D.D., was born in 1630, at Sowerby in Yorkshire, of a Puritan family. His father was in the clothing trade. After some preparatory education he became a pensioner of Clare Hall, Cambridge, in 1647, and a fellow of the college in 1651. Puritanism was at that period in the ascendancy at Cambridge; but Tillotson very early freed himself from his educational prejudices, and became the advocate of a rational and moderate orthodoxy.

He was thirty years of age before he received ordination; he had in the meantime acted as tutor in the family of Prideaux, the attorney-general to Cromwell. He was for a short time curate at Cheshunt, and also rector of Ketton in Suffolk. In 1664 he was appointed preacher at Lincoln's Inn, and lecturer at St. Lawrence's Church in the Jewry, London. Here it was that those sermons were preached which are at this day the basis of his fame.

In 1669 he was made a prebendary of Canterbury; 1672, dean of Canterbury; 1675, a prebendary of St. Paul; and 1677, a canon residentiary in the same cathedral. But as soon as King William was established on the throne, he was made dean of St. Paul's and clerk of the closet; and in April, 1691, he was nominated to the archbishopric of Canterbury. He was archbishop only three years and a half, dying in 1694. Birch's edition of his Works is in 3 vols. folio, 1752.

TILLY, or TILLI, JOHN TSERCLAS, *Count of*, was the son of Martin Tserclas, of Tilly. He was born in 1559, at the castle of Tilly, in South Brabant, and he early entered the order of Jesuits, but soon abandoned his ecclesiastical profession, and joined the army of Philip II. of Spain. In the war against the Protestants of the Netherlands he acquired that hatred of heretics which became one of the most prominent features of his character. Towards the end of the 16th century he entered the service of the Emperor Rudolph II., and distinguished himself in the wars against the Hungarian insurgents and the sultans Murad III. and Ahmed I. After the peace of Sitvatorok in 1606, he was appointed commander-in-chief of the army of Maximilian, duke of Bavaria, which was in a very disorganised state. The Liga, or the union of the Roman Catholic states in Germany, appointed him commander-in-chief of their troops, and he held this high office until his death. Tilly gained the first great victory in the Thirty Years' War, which broke out in 1618. [THIRTY YEARS' WAR.] After having defeated Christian of Halberstadt at Höchst, June 2, 1622, Tilly pursued Christian and Mansfeld to Westphalia, defeated them at Stadt-Loo, near Münster, in a battle which lasted three days (Aug. 4 to 6, 1623), and forced them to disband their troops and to take refuge in England. For his victory at Stadt-Loo Tilly was created a count of the empire. After Waldstein had been deprived of his command in 1630, and Gustavus Adolphus, king of Sweden, had landed in Germany, Tilly was appointed field-marshal and commander-in-chief of the imperial army. The first great event of the new campaign was the capture and sack of Magdeburg, May 10, 1631. Six months later, Tilly, who was in a fortified camp at Breitenfeld near Leipzig, was attacked by Gustavus Adolphus, and after a long and bloody struggle the imperial army was routed. When Tilly saw the flight of his soldiers, the wounded and weeping veteran declared that he would not survive the day on which he was to fly for the first time in his life. However he was persuaded to withdraw; and putting himself at the head of four regiments of veterans, he fought his way through the Swedish army. Although he afterwards succeeded in driving the Swedes from Franconia, Gustavus Adolphus compelled him to retire behind the Lech. Tilly endeavoured to defend the passage of the river, but a ball broke his thigh, and he was removed from the field and carried to Ingolstadt. He died on the day after the battle, April 6, 1532.

TILSIT. [KÖNIGSBERG.]

TILT-HAMMER, a large hammer worked by machinery, impelled either by a water-wheel or a steam-engine. Such hammers are extensively used in the manufacture of iron and steel, and the name *Tilt-Mill* is sometimes applied to the mechanism of which they form the principal feature.

TIMÆUS was born at Tauromenium in Sicily, B.C. 352. He was driven from his native country by Agáthocles, the tyrant of Syracuse, whereupon he went to Athens. Timæus spent fifty years at Athens in reading and studying. (Polybius, xii. 25.) About the year B.C. 260, when Athens was taken by Antigonus, Timæus returned to Sicily, where he spent the remainder of his life, and died, B.C. 256.

Timæus wrote a great historical work, the main subject of which was a history of Sicily. It began at the earliest times, and brought the events down to Olympiad 129 (B.C. 264), where the work of Polybius begins. (Polybius, i. 5.) This work is lost with the exception of a considerable number of fragments. Timæus began it at Athens, and completed it in Sicily, where he added the history of the last years of Agathocles, and the history of the campaigns of King Pyrrhus in Italy and Sicily, with which the work ended. Polybius speaks very ill of the work of Timæus, who, he says, derived all his knowledge from books, and was ignorant of political and military affairs. He is said to have been the first Greek historian who recorded events according to Olympiads and the archons of Athens. The fragments of Timæus are contained in C. and T. Müller's 'Fragmenta Historicorum Græcorum,' Paris, 1841.

TIMÆUS, a Greek Sophist, who, according to the supposition of Ruhnken, lived in the third century of the Christian æra. There is extant by him a little vocabulary containing the explanation of words and phrases which occur in the writings of Plato. It was first edited by Ruhnken, Leyden, 1754, 8vo.; a second edition appeared in 1789.

TIMÆUS of Locri, a Pythagorean philosopher, was a contemporary of Plato. There exists a work, Περὶ τῆς τοῦ κόσμου ψυχῆς ('De Animâ Mundi;' or, on the Soul of the Universe), written in the Doric dialect, which is usually ascribed to Timæus the Locrian. It contains a brief exposition of the same ideas which are developed in the Dialogue of Plato which is called after him Timæus. Separate editions of it have been published by D'Argens, at Berlin, 1762, 8vo., with a French translation; and by J. J. de Gelder, at Leyden, 1836, 8vo.

TIMA'LIA, a genus of birds characterised by Dr. Horsfield.

Generic Character.—Bill strong, compressed, deep (altum). Nostrils subrounded. Wings short, rounded. Tail elongated and graduated. Feet strong; hind-claw twice as large as the middle anterior claw. Locality, Java.

Examples.—*Timalia pileata* and *T. gularis.* In these birds the plumage is decompound, the feathers being lax, with distant, slender, elongated filaments or barbs, producing a singular effect.

Speaking of *Timalia pileata,* Dr. Horsfield observes that the species is not unfrequent in the groves and small woods which abound throughout Java. It often, he says, approaches villages and plantations, constructing its nest in the hedges; and he speaks of it as one of the social birds that delight to dwell in the vicinity of cultivation. In large forests he did not notice it. He describes its flight as low and interrupted, and adds that wherever it resides it is a welcome neighbour, in consequence of the peculiarity and pleasantness of its note, which consists of a slow repetition of the five tones of the diatonic scale (C, D, E, F, G), which it chants with perfect regularity, several times in succession, and at small intervals of time. Dr. Horsfield further remarked that the sixth tone was sometimes added; but as this required apparently an extraordinary effort, it was by no means so agreeable to a musical ear as the simple repetition of the five notes, which appeared to be the natural compass of the bird's organs. ('Zoological Researches in Java.')

TIMANTHES, a native of Sicyon or of Cythnos, was one of the most celebrated painters of Greece; he was contemporary with Zeuxis and Parrhasius, and lived about 400 B.C. The works of Timanthes were distinguished for their invention and expression, and one of the chief merits of his invention was, that he left much to be supplied by the imagination of the spectator. There is a remark in Pliny ('Hist. Nat.,' xxxv. 36), probably a quotation, which bestows the highest praise upon Timanthes: it says, though in execution always excellent, the execution is invariably surpassed by the conception. As an instance of the ingenuity of Timanthes' invention, the same writer tells us of a picture of a sleeping Cyclops, painted upon a small panel, but in which the painter had conveyed a perfect idea of the giant's huge size, by adding a few satyrs measuring his thumb with a thyrsus.

Though Timanthes was evidently one of the greatest painters of antiquity, ancient authors have mentioned only five of his works: Pausanias makes no mention of him at all, and Cicero classes him among the painters who used only four colours. He painted a celebrated picture of the Stoning to Death of Palamédes. His most celebrated work was the Sacrifice of Iphigenía, in which the painter expressed the agony of Agamemnon, her father, by covering his face with a mantle.

TIMBER and TIMBER-TREES. Timber-trees are those the wood of which is used for building or repairing houses. Oak, ash, and elm, of the age of twenty years and upwards, are the trees most generally included under that denomination; but there are many other kinds of trees, such as beech, cherry, aspen, willow, thorn, holly, horse-chestnut, lime, yew, walnut, &c., which are, by the custom of certain parts of England, considered to be timber-trees, as being used in building.

The timber-trees upon land belong to the owner of the inheritance. If the tenant for life fells timber-trees to any amount greater than he is entitled to as estovers, that is to say, the allowance of wood necessary for the reparation of houses and fences, he becomes liable to an action of waste; and the trees, which by these or any other means, accidental or otherwise, have become severed from the land, may be seized by the owner of the inheritance, or an action may be brought by him for them. (3 P. W. 267.) If however the estate of the tenant for life be with-

out impeachment of waste, he has a right to fell timber, and he is also entitled to all timber-trees which are felled and blown down during his life.

In leases for lives, when timber is included, if the lessor fells the trees, the lessee may maintain an action of trespass against him, because the lessee, though he may not cut down the trees without being subject to an action of waste, has an interest in them for shade and shelter, and a right to take the mast and fruit, and may also lop them if they be not thereby injured. But where the trees are excepted in a lease, which is usually done, the lessee has no interest whatever in them, and the lessor may bring an action of trespass against him if he fells or damages them. The lessor has also a power, incident to the exception, of entering on the land in order to fell and take away the trees; though this power, for the sake of avoiding questions, is often expressly reserved.

The timber growing on copyhold estates is, by the general custom of most manors, the property of the lord, who may cut it down, provided he leaves a sufficient quantity for the repairs of the copyhold, which the copyholder is entitled to. But the general right of the copyholder to have timber for the reparation of houses and for ploughbote and hedgebote may be restrained by custom, namely, that he shall not take it without assignment from the lord or his bailiff. (13 Rep., 68.) A copyholder in fee may, by the particular custom of the manor, have a right to cut timber-trees growing on his copyhold, and sell them; and the same right may belong by custom to a copyholder for life, who is entitled to nominate his successor, as being a *quasi* copyholder in fee.

TIMBER, PRESERVATION OF. Whatever other causes may combine to promote the decomposition of wood by dry-rot, or other forms of decay, there can be no doubt that imperfect seasoning, by leaving in the pores of the timber a large portion of the fermentable juices always found in recently-felled timber, is one of the most important, and therefore that good seasoning is as essential in promoting the durability of wood as it is in lessening the tendency to those changes of form and bulk which so greatly increase the difficulties of the carpenter and joiner. [Dry Rot.] The process of seasoning usually consists simply in the exposure of the timber to the action of air in a dry situation, in stacks or piles so constructed as to allow the free circulation of air in contact with as much as possible of the surface of each piece of timber, until the sap or vegetable juices shall have dried up so far as to offer no facility for the germination of the microscopic fungi which constitute various kinds of rot. In order to the success of this operation it is important that the pile of timber be so far elevated from the ground as to allow the circulation of air beneath as well as through and around it; and also that, if exposure to rain be not entirely avoided, care be taken to prevent the lodgment of moisture in any place where it would be likely to remain long.

The protecting power of metallic oxides, when applied to the surface of wood in the form of paint, is well known; and many abortive schemes for the preservation of timber have been devised to act upon the same principle, which is that of excluding such external influences as might promote decay. To imperfectly-seasoned timber, however, such applications are worse than useless, because by filling up the pores they impede the natural drying of the vegetable juices, and therefore rather promote than check internal decay. Far more efficient than these are the numerous modes of protection which involve the impregnation of the timber with some antiseptic substance, or with such matters as, by pre-occupying the pores, may render the reception and germination of destructive fungi mechanically impossible.

Of plans for protecting timber by impregnation, perhaps none has attained such general celebrity as Mr. Kyan's, which was patented in 1832, and has since been very extensively used. The preservative agent in this process is bi-chloride of mercury, commonly called corrosive sublimate, which is dissolved in water, and forced into the pores of the timber, in closed tanks, by means of forcing-pumps, and which combines with the albumen of the wood, and converts it into a compound capable of resisting the ordinary chemical changes of vegetable matter. Chloride of zinc, creasote obtained from the distillation of tar, oil of tar and other bituminous matters containing creasote, and pyrolignite of iron, have all been successfully used. Coal-tar is stated to be very superior to vegetable tar, and its efficacy in resisting the worm is attributed to its containing sulphocyanic or sulpho-prussic acid, which is highly destructive to animal and vegetable life. Piles protected with coal-oil are stated to have resisted the attacks of the terédo better than those protected by Kyan's process. [Teredo.] It is necessary however to observe that the coal must be deprived of its ammonia, which would produce immediate decay if thrown into the timber.

TIMBREL, a musical instrument of the highest antiquity, the *tympanum leve* of the Roman poets, and, in the opinion of all writers of any authority, the same, in an almost unaltered state, as that now known in every part of Europe under the names of tabor, tambourine, &c.

TIMBUCTOO, a large town in Africa, is situated in 17° 8′ N. lat., and 2° 58′ W. long. It appears to stand on the declivity of an inconsiderable eminence about eight miles north of the Niger. It is the nearest point at which the traders from the commercial districts that skirt the coasts of the Mediterranean W. of Barca, and of the Atlantic N. of Cape Nun, can strike, after crossing the great desert, the fertile lands extending to the S.E. and S.W. along the Upper and Lower Niger; and thus Timbuctoo has became a meeting point for many commercial routes.

Leo Africanus states that Timbuctoo was built by Mansa Suleiman, about the year 610 of the Hejira (A.D. 1214), and that it soon became the capital of a powerful state. Rulers with the title Mansa continued to govern Timbuctoo from 610 to 792 of the Hejira. The chiefs of Marocco and Fez rendered Timbuctoo tributary, and from that time the communications of the Arabs with that country became more frequent and regular. About the year 1500 a negro general of Soniheli, king of

Timbuctoo, raised the standard of revolt on the death of his master, overturned the Moorish supremacy, conquered a number of the neighbouring provinces, and recalled to Timbuctoo a part of the trade which had left it for Jenné on the Niger. About 1670 Timbuctoo fell under the dominion of the king of Bambarra. It afterwards became tributary to the prince of Tafilet, but from 1727 Timbuctoo appears to have been governed by a negro ruler.

Caillié estimates the permanent inhabitants of Timbuctoo at from 10,000 to 12,000. After the arrival of the caravans the town assumes for a portion of the year a much more populous and probably a much more bustling appearance. During his stay it was dull and listless. The streets are clean, and wide enough to allow three horsemen to pass abreast. The houses are of sun-dried bricks, and consist entirely of a ground-floor; in some a sort of closet is constructed over the entrance; the apartments are built on the four sides of an open court in the centre. Both within the town and round about it there are numerous straw huts of a conical form. The town is not walled. In the centre of the town is a square surrounded by circular huts, and planted with a few trees: in the middle of it a large hole is dug as a receptacle for filth. Two enormous heaps outside of the town appeared to be accumulations of rubbish. Some buildings on the east side of the town are overwhelmed with sand. There are seven mosques; two of them large, and part of the largest apparently of considerable antiquity: each is surmounted by a brick tower. To the W.S.W. of the town are large excavations from 35 to 40 feet deep, which collect in the rainy season the supplies of water which serve the inhabitants for drinking and culinary purposes throughout the year. There is no spontaneous vegetation near the town except some stunted mimosa-trees. Near the reservoirs are small plantations of tobacco. The inhabitants of Timbuctoo draw from Jenné their supplies of millet, rice, vegetable butter, honey, cotton, Soudan cloth, pepper, onions, dried fish, pistachias, &c.; and wood, cattle, and salt, from other quarters.

The negro and Arab inhabitants of Timbuctoo are exclusively engaged in trade. The Moors are for the most part only temporary residents. The Tuariks, who surround Timbuctoo, levy contributions on all commerce to and from the town. Several villages on the Niger are subject to Timbuctoo.

TIME. This word may be considered either with reference to our abstract idea of the thing signified by it, or to the measures of it which have been contrived for use in the business of life.

When we think of time in the usual manner, it is of a real thing external to ourselves, which we cannot help imagining to have an existence and a measure, both of which would remain though those who now speculate upon the conception were annihilated. A little more consideration shows that we are indebted for the idea to successions of observed events, or at least for the power of applying the idea to external objects. No description can be adequate. If we say that *change* necessarily implies *time*, and that the perception of that which *is* being different from that which *was*, suggests the notion of an interval, we see that we have already fully assumed the idea of time in the words *is* and *was*. But we may say that space and the objects which fill it exist independently of ourselves, and would undergo changes though we were not in existence to perceive them, and that therefore the times which those changes require would also exist. This involves the whole of the most abstruse part of metaphysics, and is much beyond the scope of our article. We shall therefore turn to the mode of measuring time. We have a thorough conviction that time is a magnitude, that is, has its *more* and *less*. We must ask ourselves in the first instance what we mean by a greater or a smaller time.

In the perception of time as a magnitude, that is, of intervals of time as containing more or less of duration, we refer in the first instance to a habit derived from continual acquaintance with those great natural successions on which the usual actions of our lives depend, with which we can constantly, though unconsciously, compare the duration of our thoughts and actions.

The actual measure of time depends upon our being able to secure successions of similar events which shall furnish epochs separated by equal intervals of time. We cannot do this by our thoughts, except approximately, and for short periods.

In all the more correct machines which have been invented to measure time, there is but one principle: a vibration is kept up by the constant application of forces only just sufficient to counteract friction and other resistances, and machinery is applied to register the number of vibrations. The remarkable law of equality of small vibrations makes it comparatively immaterial whether the vibrations are of precisely the same extent. But the imperfections of such instruments render them comparatively useless for measuring long periods, so that if we could not have recourse to the motion of the heavenly bodies, there would be no permanent measure of time. And even in astronomical phenomena there is no absolute recurrence at equal intervals, though near enough for common purposes. The value of such phenomena for the most accurate measures consists in most of their irregularities being truly distributed about a uniform mean, so that the excesses of some periods are compensated by the defects of others, giving, in the long run, power of determining that mean with as much accuracy as our modes of measurement can appreciate.

The actual revolution of the earth, as measured by the time elapsed between two transits of the same star over the meridian, is called a *sidereal day*. It is divided, as are all other days, into twenty-four hours of sixty minutes each, &c. The time so given is called *sidereal time*. If the sun were a fixed star, this sidereal time would be the common mode of reckoning. But the sun having its own slow motion in the ecliptic, in the same direction as the revolution of the earth, the interval between one meridian transit of that body and the next is longer than the simple revolution of the earth, for just the same reason that the

time which the minute-hand of a watch moves from coincidence with the hour-hand to a coincidence again is longer than the hour, or simple revolution of the minute-hand. If the sun moved uniformly, and in the equator, the real solar day, which means the interval between two meridian transits of the sun, would always be of the same length, and a little longer than the sidereal day. But the sun neither does move uniformly, nor in the equator; and each of these circumstances causes a slight irregularity in the absolute length of the solar day, or, as it is called, the *real solar day*. This is the reason why the time shown by a sundial does not agree with the watch. To remedy this inconvenience, a fictitious sun is supposed to move in the ecliptic, and uniformly, while another fictitious sun moves in the equator, also uniformly. Both the fictitious bodies have the average motion of the real sun, so that the years of the three are the same; and the fictitious sun of the ecliptic is made to coincide with the real sun at the perigee and apogee, or nearest and farthest points from the earth; while the fictitious body in the equator is made to coincide with the fictitious body of the ecliptic at the equinoxes (from which it arises that there is also a coincidence at the solstices). This fictitious sun of the equator is that to which clocks are adjusted; the interval between two of its transits, which is always of the same length, is called a *mean solar day*, which is divided into twenty-four mean solar hours, &c. The difference between time as shown by the real sun and the fictitious sun in the equator, is called the equation of time.

The determination of the equation of time is a mathematical problem of some complexity. What we have here to notice is, that owing to the joint action of the two sources of difference, it presents a very irregular series of phenomena in the course of the year. If the sun moved regularly, but in the ecliptic, there would be no equation of time at the equinoxes and solstices: if the sun moved with its elliptic irregularity, but in the equator instead of the ecliptic, there would be no equation of time at the apogee and perigee. Between the two the equation of time vanishes only when the effect of one cause of irregularity is equal and opposite to that of the other; and this takes place four times a year. In the year 1850 the state of the equation of time was as follows:—January 1, the clock is before the sundial $3^m\ 51^s$, and continues to gain upon the dial until February 12, when there is $14^m\ 32^s$ of difference. This then begins to diminish, and continues diminishing until April 15, when the clock is before the dial 3^s. The dial then is before the clock until May 15, when the equation is $3^m\ 55^s$, which diminishes until June 14, when the clock is after the dial 11^s. The clock is now before the dial, and the equation increases till July 27, when the equation is $6^m\ 10^s$, which diminishes until the 1st of September, when the clock is after the dial 6^s. The dial is now again before the clock; and by November 3 the equation has become $16^m\ 17^s$, from which time it falls off until December 24, when the clock is after the dial 11^s. The clock then gets gradually before the dial till the end of the year. The phenomena of the next year present a repetition of the same circumstances, with some trivial variations of magnitude. There are several slight disturbing causes to which we have not thought it worth while to advert.

The sidereal day is $23^h\ 56^m\ 4^s.09$ of a mean solar day, and the mean solar day is $24^h\ 3^m\ 56^s.55$ of a sidereal day.

TIME (in Music) is:—

I. The measure of the duration of sound.

II. That which divides a bar into two or three equal parts, and subdivides these.

III. The movement—*i.e.* the quickness or slowness—of a composition.

1. The duration of sound, in Music, is marked by the particular note as minim, crotchet, &c. The longest note, in relation to time, used in modern music, is the semibreve, which is considered the measure-note, and its average length is about four beats of a healthy man's pulse. The five other notes are proportionate parts of this. Thus the minim is in duration $\frac{1}{2}$ of a semibreve; the crotchet is $\frac{1}{4}$, &c.: consequently two minims, or four crotchets, &c., are equal to one semibreve.

2. Time is either duple or triple. The former divides every bar, or measure, into 2, or 4, &c. equal parts; the latter into 3, or 6, &c. A letter C indicates *common time*, having one semibreve, or its equivalent in notes, in each bar. Figures represent the fractions of a semibreve, the upper figure the numerator, the lower the denominator. When the numerator is 2 or 4, the time is duple; when 3, it is triple; when 6 or 12, it is compound-common; and when 9, it is compound-triple.

3. The term *Time*, or *Tempo*, has a third meaning annexed to it in musical language, by its employment in the sense of *movement*.

TIMO'LEON was a native of Corinth. His elder brother Timóphanes, who had been elected general by the Corinthians, having usurped the supreme power in his native city, Timoleon at first remonstrated, but when this was useless, he formed a plot against him, and Timóphanes was killed. Soon after this event, which threw all Corinth into a state of violent agitation, there arrived at Corinth ambassadors from Syracuse soliciting the aid of the Corinthians. This was a favourable opportunity for the party hostile to Timoleon to get rid of his followers, while at the same time it opened to Timoleon a field of action in Sicily. Timoleon was accordingly sent to Syracuse with a small band of mercenaries, 344 B.C. Syracuse was then divided into three parties: the popular party, which had engaged the service of Timoleon; a Carthaginian party; and the party of Dionysius, the tyrant, who had returned from Italy in B.C. 346. Dionysius had already been driven out of a part of the city by Hicetas, the tyrant of Leontini, who supported the Carthaginian party. On the arrival of Timoleon, Hicetas was compelled to withdraw to Leontini, and Dionysius, who was reduced to surrender himself and the citadel to Timoleon, was allowed to quit the island in safety, and he withdrew to Corinth, in B.C. 343. Timoleon endeavoured to restore the prosperity of the city by recalling

those who had been exiled, and by inviting colonists from other parts of Sicily. The Carthaginians sent a large force against him, but Timoleon with very few soldiers gained a decisive victory over the Carthaginians on the banks of the river Crimessus, and confined them to that part of Sicily which lies between the river Halycus and the western coast, B.C. 339. He put down the tyrants in the Sicilian towns; and Hicetas, who was made prisoner, was executed.

He now directed all his efforts to the re-establishment of Syracuse, and to the improvement of the political constitution; and though he might easily have seized on the supreme power, he was true to his engagements, and honestly discharged the important duties which the Syracusans had confided to him. Syracuse and Sicily felt the benefit of his honest labour for many years after his death.

In the latter part of his life Timoleon became blind, and lived in retirement. He died in B.C. 337, and was buried in the Agora of Syracuse.

Decadrachm of Syracuse, inserted as a specimen of the Coins of Syracuse.
British Museum. Actual Size. Silver.

(Plutarch, *Life of Timoleon;* Diodorus, Lib. xvi.)

TIMON, surnamed the Misanthrope, was a native of Attica. He lived during the Peloponnesian War, and is said to have been disappointed in the friendships he had formed, in consequence of which he conceived a bitter hatred of all mankind. He lived almost entirely secluded from society, and his eccentricities gave rise to numerous anecdotes. The comic poets ridiculed him in their comedies. Antiphanes wrote a comedy called 'Timon,' which perhaps furnished Lucian with the groundwork for his dialogue in which this misanthrope acts the most prominent part. His name has remained proverbial to designate a misanthrope down to the present day, and is immortalised by the genius of Shakspere.

TIMOR ISLANDS. [SUNDA ISLANDS.]

TIMOTE'O DA URBI'NO, or DELLA VITE, was born at Urbino. In about his 20th year he repaired to Bologna to learn the business of a jeweller, &c.; but devoted himself to painting, and according to Malvasia attended the school of Francia in that city. Here he remained five years, and returning to Urbino, so far distinguished himself, says Vasari, as to receive an invitation from his cousin Raphael in Rome to repair thither and assist him in some of his extensive works. He remained at Rome but a short time, yet long enough to learn to appreciate and to imitate the beauties of Raphael's style, and to become one of the most distinguished painters of the Roman school. His chief works are at Urbino, at Forlì, and in the neighbourhood; he executed many of them in company with Girolamo Genga: as a chapel at Forlì and part of the paintings in the chapel of San Martino in the Cathedral of Urbino; the altar-piece was painted entirely by Timoteo; he executed also some excellent works in fresco at Castel Durate. He seems to have died at the age of 54, most probably in 1534, as the date (1524) fixed by Vasari is irreconcileable with several known events of his life.

TIMO'THEUS, son of Conon of Athens, inherited from his father a considerable fortune, and he was intimate with Isócrates, Plato, and other men of talent. In B.C. 375 the Thebans, who were threatened with an invasion by the Lacedæmonians, requested the Athenians to avert this danger by sending a fleet round Peloponnésus. The request was complied with, and Timotheus was appointed commander of sixty ships, with which he was to sail round Peloponnesus and along the western coasts of Greece. In this expedition he took Corcýra, which he treated with the utmost mildness. The consequence was, that he had very easy work with Cephalonia and Acarnania. The Lacedæmonians sent out a fleet against him, and a battle was fought near the bay of Alyzia, in which the Spartans were defeated. The object of the expedition was accomplished, as the Spartans had not been able to make their projected invasion of Bœotia. Thebes had contributed nothing towards the expedition of Timotheus, and Athens, which was not in a very prosperous condition, had been obliged to bear all the expenses. Athens therefore concluded a separate peace with Sparta, and sent orders to Timotheus to return home. On his way thither he landed at Zacynthus a body of exiles. Their opponents in the island complained to Sparta, and Sparta remonstrated with the Athenians, but without effect; and the Spartans again prepared for war. Corcyra was now pressed by a Peloponnesian fleet, and sixty ships were given by the Athenians to Timotheus for the purpose of relieving the island. But he had to get the means of equipping his fleet first from the

coasts and islands of the Ægean (B.C. 373). He was not however very successful, for he was not disposed to use forcible means to get what he wanted. He was recalled before he had time to relieve Corcyra, and deprived of his command. His enemies brought him to trial for his conduct, but he was acquitted.

In B.C. 361, after the removal of his rival Iphícrates, Timotheus received the command of the fleet on the coast of Macedonia. He took Potidæa and Toróne from Olynthus, and these conquests were followed by the reduction of all the Chalcidian towns. From thence he proceeded to the Hellespont, where, with the assistance of Ariobarzanes, he gained possession of several towns.

In the year 357 B.C. Timotheus and Iphicrates, who had been reconciled, obtained the command of a fleet against the rebellious allies of Athens, especially against Samos. But the Athenian arms were unsuccessful, and a treaty was concluded between the belligerents, which put an end to the Social War. The Athenian generals however, Timotheus, Iphicrates, and Menestheus, were charged with having caused the ill-luck of the Athenians and brought to trial. Timotheus was condemned to pay a fine of 100 talents. As he was unable to pay the sum, he withdrew to Chalcis in Eubœa, where he died, B.C. 354. The injustice of this sentence was tacitly acknowledged by the Athenians after the death of Timotheus, by the manner in which his son Conon was allowed to settle the debt.

Timotheus was of a very humane and disinterested character. He sacrificed all his property in the service of his country, while other men of his age used public offices only as a means of enriching themselves.

TIMO'THEUS, of Milétus, a Greek musician and lyric poet. The time when his reputation had reached its height was about B.C. 398. He was a contemporary of Euripides, and spent the last years of his life at the court of Macedonia, where he died in B.C. 357, at the advanced age of 97. He increased the number of the strings of the lyre to eleven. Suidas mentions a great number of poetical compositions of Timotheus, which were in their time very popular in Greece.

TIMOTHY, EPISTLES OF ST. PAUL TO. Timothy, to whom these Epistles are addressed, was a native of Lystra, a city of Lycaonia, in Asia Minor. His father was a Greek, or Gentile, but his mother, Eunice, was a Jewess. Both his mother and grandmother Lois were Christian believers. (2 Timoth., i. 5.) His own devotion to his new faith was so ardent, that when St. Paul paid his second visit to Lystra, he 'would have Timothy go forth with him' as the companion of his travels. Timothy was then solemnly admitted and set apart to the office of an evangelist, or preacher of the gospel, by the elders of Lystra and St. Paul himself laying their hands upon him (1 Tim. iv. 14; 2 Tim. i. 6), though he was probably not more than twenty years of age at the time. From this period (A.D. 46) mention is frequently made of Timothy as the companion of St. Paul in his journeys, as assisting him in preaching the gospel, and in conveying his instructions to the different Christian churches.

Timothy was eventually left with the charge of the church at Ephesus, where St. Paul had made his head-quarters in Asia. How long Timothy exercised this office is not known, nor can we determine the time of his death. An ecclesiastical tradition relates that he suffered martyrdom, being killed with stones and clubs (A.D. 97) while he was preaching against idolatry in the neighbourhood of the temple of Diana at Ephesus. His supposed relics were removed to Constantinople, with great pomp, A.D. 356. Shortly after Timothy's appointment to the superintendence of the church at Ephesus, St. Paul wrote to him his First Epistle; the date of which was probably about A.D. 64, after St. Paul's first imprisonment at Rome. It was written with the view of guiding and directing Timothy in his ministry as the head of the church at Ephesus, to instruct him in the choice and ordination of proper officers, and to warn him against false teachers. The Epistle was written from Nicópolis in Macedonia (Titus, iii. 12), and not from Laodicéa, as the subscription informs us. The undesigned coincidences between it and the Acts of the Apostles are given in Paley's 'Horæ Paulinæ.'

The Second Epistle was written by St. Paul while he was a prisoner at Rome; but whether he wrote it during his first imprisonment, recorded in Acts, xxviii., or during a second imprisonment, has been much questioned. The immediate design of St. Paul in writing this Epistle was, it would seem, to apprise Timothy of the circumstances that had recently happened to himself at Rome, and to request his immediate presence there.

Whatever doubt may exist as to the date of the first epistle, the authenticity of both has never been questioned. In conjunction with those to the Thessalonians and Titus, they are extremely valuable, as furnishing very strong evidence to the truth of many of the facts related in the Acts of the Apostles.

TI'MUR, SULTAN, *Kiamram Kotb-ed-Dín Gurgan Sáheb-Kirán Jihángir*, that is, 'Sultan Timur, the fortunate, the axis of the faith, the great wolf, the master of time, the conqueror of the world,' was born in 736 A.H. (A.D. 1335), at Kesh, a town south-east of Samarkand. He was the son of Tárághaï-Nowian, who was chief of the Turkish tribe of the Berlas, which inhabited the district of Kesh. He was of Mongol origin, and a direct descendant from Genghis-Khan. Timur was a soldier at the age of twelve years. After the death of his father, his uncle Seïf-ed-Dín became chief of the Berlas; but a war having broken out between Husein, khan of Northern Khorásán, and Jagataï, and Timur-Togluk, khan of the Getes (Getæ), in Northern Turkistan, young Timur supported Husein, and in this war received a wound in his thigh, in consequence of which he became lame. From this he was called Timur-Lenk, or the lame Timur, which has been corrupted by Europeans into Tamerlane. Husein rewarded him with the hand of his sister Turkan (1363). Notwithstanding these favours, Timur rebelled against his protector (1365), and Husein, being

several times defeated, was at length murdered by his own emirs (1366). Balkh, the capital of Jagataï, was taken by storm and destroyed after a siege of three years (1369), and Timur was proclaimed khan. He chose Samarkand for his capital. Husein-Sofi, khan of Khowaresm (Khiwa), having imprisoned Timur's ambassadors, was attacked by Timur, who took the town of Khowaresm in 1379. Previously to this the khan of the Getes had been compelled to pay homage to Timur, who thus became master of a part of Siberia and of the whole country which we call Turkistan. Timur now sought to make himself master of all the former possessions of Genghis Khan. He first attacked Khorásán, or the north-eastern part of Persia, which soon fell under his yoke. The inhabitants of Sebsewár having revolted, Timur took the town by storm, and inflicted great cruelties on the inhabitants. Shah-Sheja, of the dynasty of Mozaffer, who reigned in Fars and southern Irák, next submitted to Timur without resistance. Thus Sultan Ahmed, of Northern Irák and Azerbiján, or Western Persia, had alone to sustain the attacks of the Tartars (1386). Timur having overcome this sovereign in one campaign, Kars fell into his hands. Tiflis also surrendered, and the Prince of Georgia purchased his protection by adopting the Mohammedan faith. The Prince of Shirwán sent tribute, and Taherten, King of Armenia, submitted without any resistance; but Kárá-Yósuf, Prince of Diyarbekir, and master of the country round Lake Van, prepared to defend himself. A body of Timur's army marched against him, and took the fortresses of Akhlat and Adiljuwáz by storm; and Timur himself took the fortress of Van with terrible slaughter. A revolt of the inhabitants caused Timur to march to Ispahan, which he took by assault: he spared the lives of artists and scholars, but the remainder of the inhabitants were massacred. More than 70,000 heads were laid at the feet of the conqueror (1387).

Timur next turned his arms towards the north, and overran the kingdom of Kiptshak, which was then governed by Toktamish-Khan. This war lasted from 1387 to 1396. According to Sherefed-Dín, Timur started from Tashkend, on the Jaxartes, Jan. 19, 1391, and in a few months, drew up his army on the banks of the Bielaya, a southern tributary of the Kama, which flows into the Volga. Toktamish, who was in the environs of Orenburg, hastened thither, and fought that dreadful battle (June 18, 1391), in which his whole army was slaughtered.

In the following year (1392) Timur returned to his residence at Samarkand. Meanwhile troubles broke out in northern Persia, which were put down by Timur's generals. Timur himself attacked southern Persia after his first return from Kiptshak, and having re-established his authority, his son Mirán-Shah was invested with the government of Fars and Khuzistán. From Shiraz Timur mached westwards to attack the king of Bagdad, Ahmed Jelair. Bagdad surrendered without resistance, and Sultan Ahmed fled towards the Euphrates, pursued by Timur, who again defeated him before he had reached that river. Timur remained at Bagdad for two months, having sent all the scholars and artists of that city to Samarkand.

During this time Kárá-Yúsuf, Prince of Diyarbekir, had recovered some districts round Lake Van, and several princes in Armenia and Georgia were still independent. Timur resolved to bring them to subjection, and having subdued all Armenia and Georgia, he reached the river Terek in the Caucasus, and there fought another bloody battle with the khan of Kiptshak. In 1395 and 1396 Timur conquered all Kiptshak, and penetrated as far as Moscow, whereupon he left the command of these countries to his lieutenants, and returned to Samarkand.

Under the pretext of supporting the rivals of Mahmud, who after the death of Firuz Shah had established his authority over all the territories between the Indus and the Ganges, Timur declared war against India. He left his capital (1398), and defeated the Indian army in a battle near Delhi, which town, with all its immense treasures, fell into the hands of the conqueror, who sent several thousands of artists and skilful workmen to Samarkand. Timur pursued the army of Mahmud as far as the sources of the Ganges, and after having established his authority in the conquered countries, returned to Samarkand in the same year.

Meanwhile troubles had broken out between the vassal princes of Persia and the countries west of it. This gave Timur an excuse to overrun the country between Persia and Syria. Siwas (Sebaste), one of the strongest towns of Asia Minor, which belonged to the Osmanlis, was taken after a siege of eighteen days. The Mohammedan inhabitants were spared; the Christians, among whom were more than 4000 Armenian horsemen, were interred alive (1400). Among the prisoners was Ertoghrul, the son of Bayazid, sultan of the Osmanlis, who was put to death after a short captivity. Bayazid now prepared to attack Timur in person, but before he had crossed the Bosporus, Timur, offended by Ferruj, Sultan of Egypt, overran Syria, then a dependence of Egypt. The army of Ferruj was routed at Haleb, and the town was taken by the Tartars, Nov. 2, 1400, which was followed by the fall of Damascus, March 25, 1401. Bagdad having revolted, Timur took it by storm, July 9, 1401, and 90,000 human heads were piled up on the public places of the town.

Timur now assembled his army near Haleb, and, crossing the range of the Taurus, proceeded to the northern part of Anatolia. At Angora he met with Bayazid. The battle, one of the most eventful which have ever been fought, took place July 20, 1402. After an obstinate resistance, the Osmanlis, who were less numerous than the Tartars, were routed. [BAYAZID.]

The sons of Timur pursued the sons of Bayazid as far as the Bósporus, but did not cross this channel. They ravaged the country, and afterwards joined their father Timur, who with the main body of his army took Ephesus, and laid siege to Smyrna. This town, which belonged to the Knights of St. John at Rhodes, fell after a gallant resistance, in Dec. 1402. After having thus carried his arms as far as the shores of the

Ionian Sea, Timur withdrew to Persia to quell an insurrection, and then returned to Samarkand. He was preparing for the conquest of China, but he died on his march to that country, at Otrar on the Jaxartes (Feb. 19, 1405). A considerable part of Timur's western and northern conquests, Asia Minor, Bagdad, Syria, Georgia, Armenia, and the whole kingdom of Kiptshak, were lost by his successors almost immediately after his death. In Persia and Jagataï his descendants reigned for a century; and for three centuries they ruled over Northern India under the name of the Great Moguls.

Sheref-ed-Dín-'Ali wrote the history of Timur in Persian, which has been translated into French by Pétis de la Croix, under the title 'Histoire de Timur-Bec, connu sous le nom du Grand Tamerlan,' &c., Paris, 1722. This is the best of the many works concerning Timur.

TIN. This metal is one of those which were earliest known, though it occurs in comparatively few countries. It is found in England, Saxony, Bohemia, Hungary, the isle of Banca, the peninsula of Malacca, in Chili, and Mexico. Malacca furnishes the purest tin, and Cornwall the largest quantity. It occurs in two states of combination, the Peroxide of Tin and Double Sulphuret of Tin and Copper: this last is rather a rare substance, and it is from the former that the metal is almost entirely obtained.

The peroxide is found in Cornwall in combination with other metals, in *Tin-Stone;* and in loose rounded masses called *Stream-Tin.* The former, when reduced to the metallic state, yields *Block-Tin;* while the latter yields *Grain-Tin,* which is the purer of the two. The tin-stone, which contains 77 per cent. of pure tin, occurs in a crystalline form, as well as in masses; but stream-tin is uncrystallised, and has evidently been derived from the destruction of tin veins or lodes, the lighter portions of stony matter having been carried away by the water, which has rounded the fragments of the ore.

This metal is of a silver-white colour, very soft, and so malleable that it may be reduced into leaves 1-1000th of an inch thick, called tin-foil: it suffers but little change by exposure to the air. Its tenacity is but slight, so that a wire of 1-15th of an inch in diameter is capable of supporting only about 31 lbs.: a bar a quarter of an inch in diameter was broken by 296 lbs. weight. Tin is inelastic, but very flexible, and when bent it produces a peculiar crackling noise. When rubbed it imparts to the fingers a peculiar smell, which remains for a considerable time. Its specific gravity is about 7.29: at 442° Fahr. it fuses, and if exposed at the same time to the air, its surface is tarnished by oxidation, and eventually a gray powder is formed. When heated to whiteness it takes fire, and burns with a white flame, and is converted into peroxide of tin. If slowly cooled after fusion, it exhibits a crystalline appearance on solidifying.

The following are the chief combinations of tin with other substances:—*Oxygen* and *Tin* combine to form three oxides; the *Protoxide* ($T^1 O^1$) is of a fine bluish-black colour, very soluble in hydrochloric acid, and when heated in the air takes fire, burns, and is converted into peroxide; its salts very readily absorb oxygen from the air, and form compounds which readily yield oxygen; the *Sesquioxide* ($T^2 O^3$) is a slimy gray matter, which is generally slightly yellow, from the presence of a little peroxide of iron; the *Peroxide* ($T^1 O^2$) is of a straw-yellow colour: when it has been rendered red-hot it is quite insoluble in acids, and acts as an acid by forming soluble compounds with the alkalies, which are called *Stannates. Chlorine* and *Tin* combine to form two *chlorides:* the *Protochloride* (T^1 Chl.^{1}) is used as a mordant in calico-printing, and in chemical investigations as a deoxidising agent; it is a gray solid, of a resinous lustre, which fuses below redness and sublimes at a high temperature; the *Bichloride* (T^1 Chl.^{2}) is a colourless limpid liquid, which fumes strongly in moist air; it boils at 248°, is rendered solid by the addition of one-third of its weight of water, and dissolves in a larger quantity; a solution of this salt, under the name of Nitromuriate of Tin, is extensively used in dyeing and calico-printing. *Sulphur* and *Tin* combine to form three sulphurets: the *Protosulphuret* ($T^1 S^1$) is of a bluish-black colour, has a metallic lustre, fuses at a red heat, and when cooled has a lamellated texture; the *Sesquisulphuret* ($T^2 S^3$) has a deep grayish-yellow colour, and when strongly heated is reconverted to the state of protosulphuret; the *Bisulphuret* ($T^1 S^2$), formerly known to the alchemists by the name of *Aurum Musivum,* or *Mosaic Gold,* is in crystalline scales, and sometimes in six-side plates, of a golden-yellow colour and metallic lustre; it is soluble in nascent chlorine, and also in solution of potash and soda, forming what have been called *Sulphur Salts. Phosphorus* and *Tin* combine to form a *Phosphuret* ($T^1 Ph^3$); it is of a silvery-white colour, and soft enough to be cut with the knife. *Iodine* and *Tin* combine to form two iodides: the *Protiodide* ($T^1 I^1$) is a red translucent substance, very fusible, soluble in water, and volatile at a high temperature; the *Periodide* ($T^1 I^3$) appears in crystals of a silky lustre. *Selenium* and *Tin* form a *Seleniuret,* which is a spongy mass, of a gray colour and metallic lustre; when heated, selenium is expelled and peroxide of tin remains.

The oxides of tin form numerous salts by combination with acids. The *Protonitrate* is a yellow uncrystallisable solution. The *Pernitrate* is colourless and yields no crystals. The *Sulphate* occurs in colourless solution. The *Carbonate* is a white precipitate. The *Phosphate* and the *Perphosphate* are both insoluble white precipitates.

Most of the malleable metals are rendered brittle by alloying with tin; it combines readily with potassium and sodium, forming brilliant white alloys, which are less fusible than tin. With arsenic it forms a metallic mass which is whiter, harder, and more sonorous, than pure tin. With antimony tin forms a white, hard, and sonorous alloy. Bismuth forms with tin an alloy which is more fusible than either of the metals separately, a mixture of equal weights melting at 212°; this compound is hard and brittle. Copper and tin form alloys which are well known and highly useful—*Bell-Metal* and *Bronze.* With mercury tin readily amalgamates, and the compound is used

for silvering mirrors. Tin forms with iron white compounds, which are more or less fusible according to the proportion of iron they contain. Tinplate is of all the alloys of tin the most useful, and the preparation of this and of pewter are the most extensive applications of this very valuable metal.

TIN, SMELTING AND REFINING OF. The ores of tin raised in Cornwall and Devonshire are always reduced, or smelted, within those counties, their exportation being prohibited. The smelting-works do not generally belong to the proprietors of the mines, but to other parties who purchase the ore from them, their value being determined by a kind of assay. The smelting is effected by two different methods, according as *tin-stone* or *stream-tin* is to be acted on.

In the former process the prepared ore, which is called *schlich* (the mining, breaking, and washing of which are described under MINING), is mixed with from one-fifth to one-eighth of its weight of powdered anthracite, or culm, to which a little slaked lime or fluor-spar is sometimes added as a flux. The charge (from 12 to 24 cwts.) is spread upon the concave hearth of the furnace, and then the apertures by which it is inserted are closed and luted, and the furnace is gradually heated, and kept hot for six or eight hours, by which time the reduction of the ore is complete. When the fusion or reduction of the ore is considered to be finished, one of the apertures of the furnace is opened, and the scoriæ removed; after which a channel is opened, by which the melted tin flows from the hearth into a large vessel, where it is allowed to rest for some time, in order that the impurities yet remaining with the metal may separate, by their different specific gravities. When it has settled, the tin is ladled into moulds, so as to form it into large blocks or ingots.

The ingots produced by the above process frequently contain portions of other substances, to remove which the tin is exposed to the process of *refining*. The tin is again melted in another furnace; and into the molten metal billets of green wood are plunged. This occasions the disengagement of considerable volumes of gas from the wood, and thus a kind of ebullition is produced in the tin, which causes the lighter impurities to rise to the surface in a frothy form, and the heavier to fall to the bottom. The scum is removed, and the rest is allowed to settle, whereby all the purest tin rises to the top, and the quality deteriorates thence to the bottom; by which means the tin, poured into moulds, presents many different qualities. The moulds are made of granite, and yield blocks of tin weighing about 3 cwts. each. A duty is paid on every block of tin to the Duchy of Cornwall. An inferior kind of tin is produced by remelting the scoriæ. The average quality of the tin ore, as prepared for the smelting-furnaces, is such as to yield 62 to 65 per cent. of pure tin; and the quantity of coal required for producing one ton of tin is about a ton and three-quarters.

The smelting of tin by the blast-furnace, with wood-charcoal, is practised on a limited scale for the production of tin of the greatest possible purity, and from *stream-tin* instead of *tin-stone*. No substance is added to the ore and charcoal, unless it be the residuary matter of a previous smelting; and the proportion of charcoal consumed is about one ton and six-tenths for every ton of tin produced. The melted tin runs from the furnace into an open basin, whence it is run off into a large vessel in which it is allowed to settle. The scoriæ which run with the metal are skimmed off, and separated into two portions, one consisting of such as retain tin oxide, and the other of such as have no oxide, but contain tin in a granulated state. In order to convert the blocks of tin produced by the blast-furnace process into the form known as *grain-tin*, they are heated until they become brittle, and made to fall from a considerable height in a semi-fluid state, thus producing an agglomerated mass of elongated grains.

Tin is rarely employed alone in our metalline manufactures, but when laid in a thin coat upon the surface of sheet-iron by the process of *Tinning*, it produces a material of extensive use in the manufacture of culinary and other articles. Most of the tin used in the manufacture of articles composed exclusively of that metal is that which is expanded by rolling and hammering into leaves of *tin-foil*; this is the substance which is laid upon the back of glass mirrors, and there amalgamated with mercury, so as to form what is called the *Silvering*.

TIN-PLATE MAKING, or TINNING. The art of tinning, or of coating other metals with a thin layer of tin, so as to protect them from oxidation, was known to the ancients, although it does not appear to have been very extensively practised. The tinning of plate-iron is more modern than that of copper vessels, and is supposed to have been invented either in Bohemia or in Germany, whence it spread to France about 1725, and to England about 1730.

The process of tinning depends upon the strong affinity which exists between tin and the metals to which it is applied. The finest bar-iron, called *tin-iron*, is used for making tin-plates. This material is first made into flat bars, or slabs, about thirty inches long, six inches wide, and weighing eighty pounds; and these bars are rolled until the metal assumes the proper degree of thinness, after which the sheets are cut into pieces, measuring usually about thirteen inches by ten.

The removal of every particle of oxide or other impurity from the surface of the plates is then effected by the application of muriatic acid and of heat; and any warping is removed by a process of cold-rolling between very hard rollers. The plates are then immersed singly, in a vertical position, in a fermented steep of bran; whence, after 10 or 12 hours, they are transferred to a leaden vessel containing diluted sulphuric acid. They are then removed into pure water, in which they are scoured with hemp and sand, to remove any remaining oxide. They are next dried by rubbing with bran, greased on both surfaces, and plunged into the metallic bath, which contains a mixture of block and grain-tin, covered with a quantity of

grease sufficient to form a layer four inches deep, and heated. When the plates have remained in the tin bath an hour or two, they are lifted out with tongs, and placed upon an iron grating, to allow the superfluous tin to drain off; but as there still remains upon them much more than the proper quantity of tin, they are afterwards subjected to a process called *washing*, which consists in dipping them into a pot containing a quantity of pure grain-tin in a melted state, then rubbing them with a peculiar kind of brush made of hemp, plunging them again for a moment into the melted tin in the wash-pot, and then into a pot filled with clean melted tallow, or lard free from salt. Owing to the vertical position of the plates during the preceding operations, a selvage of tin accumulates along their lower edge, which is partially removed by a re-melting and shaking of the edge. The plates are then cleaned from grease by rubbing them, while yet warm, with dry bran; after which they are packed in boxes of wood or sheet-iron.

The tinning of the inner surfaces of cooking utensils and other vessels of capacity is formed by scouring the surface until it is perfectly bright and clean; then heating the vessel, pouring in some melted tin and rolling it about, and rubbing the tin all over the surface with a piece of cloth or a handful of tow: powdered rosin is used to prevent the formation of oxide. Bridle-bits, stirrups, and many other small articles, are tinned by immersing them in fluid tin.

TIN-PLATE WORKING.—Tin-Plate Working, or the forming sheets of tinned iron into a variety of useful vessels and utensils, is carried on by means of bench and hand-shears, mallets and hammers, steel heads and wooden blocks, soldering-iron and swages. In the formation of a vessel the first operation is to cut the plate to the proper size and form with shears; and when the dimensions of the article require it, to join them together, which is done either by simply laying the edge of one plate over that of the other, and then soldering them together, or by folding the edges together with laps, and then soldering them. Similar joints are required when gores or other pieces are to be inserted, and also at the junction by which a cylinder is closed in. The usual method of forming laps, bends, or folds for this or other purposes is to lay the plate over the edge of the bench, and to bend it by repeated strokes with a hammer; but a machine is sometimes used for this purpose.

After a tin vessel has been rounded upon a block or mandril, by striking it with a wooden mallet, and the seams finished, all its exterior edges are strengthened by bending a thick iron wire into the proper form, applying it to what would otherwise be the raw edges of the metal, and dexterously folding them over it with a hammer. A superior kind of tin-ware, commonly known as *block-tin-ware*, is carefully finished by beating or planishing with a polished steel hammer upon a metal stake. The process of *swaging* is resorted to as a ready means of producing grooved or ridged borders or other embossed ornaments. This process consists in striking the metal between two steel dies or swages, the faces of which bear the desired pattern, and are made counterparts to each other. Many ornamental articles are produced by embossing or stamping tin-plate, in the same manner as other metallic sheets, with a fly-press or other machinery. Cheap coffin-plates are manufactured at Birmingham in this way; and these and similar articles are sometimes lacquered, painted, or japanned. A beautiful method of ornamenting tin wares by producing a crystallised appearance on the surface, through the medium of acid-washing and lacquer-varnishing, was much practised a few years since, under the name of *moirée métallique*, or crystallised tin-plate.

Tin forms the principal ingredient in various kinds of pewter and other white metallic alloys, which are manufactured into domestic utensils by casting, stamping, and other processes. *Britannia Metal* is a mixture of tin, antimony, copper, and brass; which is melted, cast into slabs, and rolled into sheets. The principal use of this metal is for candlesticks, tea-pots, coffee-biggins, and other vessels for containing liquids. The feet of candlesticks, the bodies of tea-pots, and other articles containing embossed work, are stamped between dies; while articles of a more globular shape are stamped in two or more pieces, which are afterwards soldered together. The sheet metal has a ductility which enables it to be bent into various curved forms, by pressure on a model or core: this process is called *spinning*.

Many small vessels, spoons, and other articles, are cast in an alloy somewhat harder than that which is rolled into sheets. Articles of this metal are cleaned from the oil, rosin, and other impurities acquired during their formation, by boiling in water containing sweet soap; after which they are polished, either by hand, or more commonly by the buff and brush set in motion by a steam-engine; then boiled in a solution of pearlash; and finally hand-brushed and hand-polished by an application of soft soap, a little oil, and powdered rotten-stone.

TINAMOU (*Tinamus*, Lath.; *Tetrao*, Linn.; *Tridactylus*, Lacép.; *Crypturus*, Ill.; *Pezus*, Spix), a genus of birds placed by Cuvier, Vigors, and Swainson, among the *Tetraonidæ*.

Mr. G. R. Gray makes the *Tinamidæ* the sixth family of the *Gallinæ*, and divides them into two subfamilies, *Turnicinæ* and *Tinaminæ*.

The Tinamous are natives of the New World, and there appear to represent the partridges, or perhaps the bustards, of the Old World (Swainson in 'Classification of Birds,' and in 'Zool. Illustrations'). One species is well described by Mr. Darwin, who, in his graphic description of the country around Maldonado, when he reached the farthest point which he was anxious to examine, says:—'The country wore the same aspect, till at last the fine green turf became more wearisome than a dusty turnpike-road. We everywhere saw great numbers of partridges (*Tinamus rufescens*). These birds do not go in coveys, nor do they conceal themselves like the English kind. It appears a very silly bird. A man on horseback, by riding round and round in a circle, or rather in a spire, so as to approach closer each time, may

knock on the head as many as he pleases. The more common method is to catch them with a running noose or little lazo, made of the stem of an ostrich's feather, fastened to the end of a long stick. A boy on a quiet old horse will frequently thus catch thirty or forty in a day. The flesh of this bird, when cooked, is delicately white.' ('Journal of Researches in the Countries visited by H.M.S. Beagle.')

TINCA, a genus of fishes founded by Cuvier, and which has for type the common Tench, *Cyprinus tinca*, Linn.; *Tinca vulgaris*, Cuv. This fish belongs to the carp family (*Cyprinidæ*), and is separated generically on account of the small size of the scales with which the body is covered, combined with the small antero-posterior extent of the dorsal and anal fins, both of which are destitute of the anterior bony spine, or any such as are observable in some allied fishes, as in the dorsal fin of the barbel for instance. The barbules to the mouth are very small.

The tench, observes Mr. Yarrell, inhabits most of the lakes of the European continent. In this country, though frequent in ornamental water and ponds, it is but sparingly found in the generality of our rivers. There is some doubt whether, like the carp, its origin be not foreign, and whether those rivers that can now boast of it are not indebted for it to the accidental escape of fish from the preserved waters of neighbouring gentlemen. The rivers it is mostly in are those which are slow and deep, and in such situations it does not appear to be so prolific as in ponds. Cuvier observes that the tench inhabits by preference stagnant waters. This is in accordance with the observations of Mr. Yarrell, and, rivers being an unnatural habitat for the fish, will account for their being less prolific in such situations.

TINCHEBRAI. [Orne.]

TINCTURES are solutions of the active principles, mostly of vegetables, sometimes of saline medicines, and more rarely of animal matters, in certain solvents. From possessing more or less of colour, they have obtained this name. They are distinguished according to the kind of solvent employed. When alcohol is used, they are termed *alcoholic tinctures*, or more generally simply *tinctures;* when sulphuric æther is used, they are denominated *ætherial tinctures*. When wine is used, though differing little from pure alcohol, the term *medicated wines* is applied to them; and when the process of distillation is employed to aid the extraction, particularly of volatile oils, the result is termed a *spirit*, such as of rosemary. Ammonia is sometimes conjoined, and the proceeds termed an *ammoniated tincture*. In some cases less of the principal ingredient is taken up or dissolved when ammonia is used, than when simple alcohol is employed, as in the tinctura guaiacum ammoniatum. Formerly some tinctures were called *essences*, from the term *esse*, it being thought that they contained only the purer or more refined portion, the alcohol leaving all the baser principles, such as the starch, gum, woody fibre, &c., undissolved: *quintessence* was a still higher degree of this. These terms are now disused by pharmaceutists, though retained by the people. *Elixirs* differ only from being of a greater consistence: they are not unfrequently turbid from the extractive matter suspended in them. Tinctures are further distinguished into simple and compound. They are called *simple* when one substance only is submitted to the solvent; *compound*, when two or more are. Another important distinction among tinctures is founded upon the degree of strength of the alcohol employed. Where the active principle is nearly pure resin, a strong spirit is needed; when much gum is associated with the resin, a weaker is required. Hence some tinctures are prepared with *proof spirit*, as the greater number; a few with *spirit above proof;* and some with *rectified spirit*.

TINDAL, MATTHEW, was the son of the Rev. John Tindal, of Beer-Ferris in Devonshire, where Matthew was born about 1657. In 1672 he was admitted of Lincoln College, Oxford, but he removed to Exeter College, and was finally elected to a law fellowship at All Souls, soon after he had taken his degree of B.A., in 1676. He proceeded LL.B. in 1679, and was created LL.D. in 1685. Soon after this he went over to the Church of Rome, but in 1708 he reverted to the Church of England some months before the Revolution.

He first appeared as an author in November, 1693, and the following two years, by the publication of some essays; but the first work by which he attracted general attention was an 8vo. volume which he published in 1706, entitled 'The Rights of the Christian Church Asserted, against the Romish and all other Priests who claim an independent power over it.' This work, which is an elaborate attack upon the theory of hierarchical supremacy, immediately raised a vast commotion. Replies to it were immediately published by the celebrated William Wotton, by Dr. Hickes (Tindal's old college tutor), and others. The controversy continued to rage for several years; and a bookseller and his shopman were indicted for selling the book. In 1707 Tindal published 'A Defence' of his work, and, a few months after, 'A Second Defence,' both of which he republished together, with additions, in 1709; the same year he also reprinted his two Essays on Obedience and the Law of Nations, along with 'A Discourse for the Liberty of the Press, and an Essay concerning the Rights of Mankind in matters of Religion.' About the same time he came forth with a fresh pamphlet, entitled 'New High Church turned Old Presbyterian,' in exposure of the pretensions put forward by Sacheverell and his party; upon which the House of Commons, which the day before had condemned Sacheverell's sermons to be burned, March 25, 1710, impartially ordered Tindal's 'Rights of the Christian Church' and the second edition of his two 'Defences' to be committed to the flames at the same time. This proceeding drew from Tindal the same year three more pamphlets: 'A High-Church Catechism;' 'The Jacobitism, Perjury, and Popery of the High-Church Priests;' and 'The Merciful Judgments of High Church triumphant, on Offending Clergymen and others, in the reign of Charles I.' The next year, on the Lower House of Convocation having drawn up and printed 'A Representation of the present

state of Religion, with regard to the late excessive growth of Infidelity, Heresy, and Profaneness,' Tindal forthwith replied in 'The Nation Vindicated from the Aspersions cast on it' in the said representation. For some years from this date Tindal's active pen was exclusively occupied with the politics of the day; but his performances do not appear to have been very effective at the time, and have been long forgotten.

In 1730 he produced, in a 4to. volume, the work by which he is now chiefly remembered, his 'Christianity as Old as the Creation, or the Gospel a Republication of the Religion of Nature.' The object of this work is, without an express denial of Christianity, to contend that there is nothing more in that religion properly understood, than what the human reason is quite capable of discovering for itself, and by implication to deny that any special revelation has ever been made by the Deity to man. The book made a great noise, and various answers to it soon appeared. Tindal defended himself in 'Remarks on Scripture Vindicated, and some other late Writings,' 1730. But this was his last publication. He died Aug. 16, 1733. Tindal never held any preferment except his law-fellowship; but it is stated, in the 'Biographia Britannica,' that in the reign of King William he frequently sat as judge in the Court of Delegates, and had a pension of 200*l.* a year granted to him by the crown for his services in that capacity.

TINDAL, REV. NICHOLAS, a nephew of Dr. Matthew Tindal, was born in 1687. Having studied at Exeter College, Oxford, and taken his degree of M.A. in 1713, he was afterwards elected a Fellow of Trinity College in that university. In 1722 he was presented to the vicarage of Great Waltham in Essex; in 1738 he was appointed chaplain to Greenwich Hospital; in 1740 he was presented to the rectory of Calbourne, in the Isle of Wight, upon which he resigned Great Waltham; and very soon after he obtained the rectory of Alverstoke in Hampshire. He died at Greenwich Hospital June 27, 1774.

Mr. Tindal's first literary attempt was a work published in monthly numbers in 1724, under the title of 'Antiquities, Sacred and Profane, being a Dissertation on the Excellency of the History of the Hebrews,' &c. This was followed by two numbers of a History of Essex, which was then dropped. He then engaged in his most memorable undertaking, the translation, from the French, of Rapin's 'History of England,' which appeared in 1726 and following years. In 1744 a continuation of Rapin down to the end of the reign of George I. by Tindal, began to be published in weekly folio numbers, which was completed in 1747. It is generally stated that he was assisted in both undertakings by Mr. Philip Morant. Tindal also published a translation, from the Latin, of Prince Cantemir's 'History of the Growth and Decay of the Othman Empire,' which appeared in a folio volume in 1734. Coxe attributes to Tindal 'great accuracy of research, judgment in selection, and fidelity in narration.'

TINNEVELLY. [HINDUSTAN, vii. 192.]

TINNITUS AU'RIUM, ringing in the ears, may arise from many different conditions. It is sometimes due to an unnatural state of the circulation in some part of the ear, the movement of the blood producing a vibration of the nerve which the mind does not distinguish from that produced by sonorous vibrations of the air. But most frequently the sensation is due to some disordered state of the auditory nerve, and is entirely subjective. It is thus perceived in some diseases of the brain, in nervous persons, and in those who are much debilitated; and is a common sign of organic disease of the auditory nerve itself.

TINTORETTO, JA'COPO, was the son of a dyer (Tintore), whence the agnomen of Tintoretto: his family name was *Robusti;* and he was born at Venice in 1512. He was placed at an early age in the school of Titian, who however dismissed him almost immediately, on discovering some rather startling proofs of his talent for painting. This remarkable rebuff only added vigour to his energies, and he commenced a course of indefatigable application. He resolved to combine the design of Michel Angelo with the colouring of Titian, and accordingly he copied the casts of the one by candlelight, and the pictures of the other by day. The single candle by which he worked at night first awakened his taste for strong contrasts of light and shade, and this he cultivated with great zeal and ingenuity. Tintoretto's first picture which attracted notice was one containing portraits of himself and his brother by candlelight. He shortly afterwards exhibited a large historical piece upon the Rialto, which gave him a rank amongst the great painters of Venice. He was so eager for employment that he undertook every commission which offered itself, and frequently painted large works merely for the price of the materials. His works amounted to many hundreds. One of his first great works in fresco was a façade in the Arsenal, which he painted in 1546, representing Belshazzar's Feast and the Writing upon the Wall. Of his oil pictures the following were most remarkable:—The Tiburtine Sibyl, for the church of Santa Anna; the Last Supper, and the Washing of the Disciples' Feet, for the church of Santa Marcola; for San Severo, a Crucifixion, very large; and in the church of the Trinità, the Temptation of Eve and the Death of Abel. The Miracle of St. Mark, called 'Il Miracolo dello Schiavo,' is generally considered the best of all Tintoretto's works. It was painted in his thirty-seventh year for the brotherhood of St. Mark. Tintoretto executed many works for the government of Venice, both in oil and fresco.

Tintoretto was a remarkably rapid painter: he was however as careless as he was bold. Although he professed to draw in the style of Michel Angelo, and to colour like Titian, there are few traces of either quality in the great majority of his works; they are however all conspicuous for his own peculiar style of chiar'oscuro, which is frequently both heavy and cold. In his design Tintoretto was muscular, but lean, and often incorrect. He died at Venice in 1594. He had two children, a son, Domenico, and a daughter, Marietta, who both practised painting. Domenico was born in

1562, and died in 1637. Marietta was born in 1560, and died before her father, in 1590. She painted very excellent portraits.

TIPPERARY, an inland county of the province of Munster in Ireland. It is bounded N.E. by King's County and Queen's County, E. by the county of Kilkenny, S.E. and S. by the county of Waterford, S.W. by that of Cork, W. by those of Limerick and Clare, and N.W. by the county of Galway, from which, as well as from Clare, it is separated by the Shannon. The area is 1659 square miles. The population in 1841 was 435,553.

Surface and Geology.—The Knockmeledown Mountains, on the south border of the county, where it is conterminous with Cork, rise to the height of 2700 feet above the level of the sea. They are placed in a table-land of clay-slate, surmounted and bordered on the flanks by sandstone. This tract of clay-slate is surrounded by floetz limestone on the north, the west, and the south. This limestone tract on the north separates the Knockmeledown Mountains from the Galtees, of which the principal summits (3000 feet high) are in this county. The general direction of these two ranges is nearly east and west. The intermediate limestone plain or valley is watered by the Tar, flowing eastward into the Suir, and the Funcheon, flowing westward into the Blackwater. North of the Galtees, from which they are separated by a narrow valley (the Glen of Aherlow), rise the Slievh-na-Muck Mountains, which form a subordinate and lower range, and have the same general direction of east and west. Both the Galtees and the Slievh-na-Muck are composed wholly of sandstone, and the intermediate valley or glen appears to be occupied by the same formation. The northern face of the Galtees, towards this narrow valley, is in many parts extremely precipitous, and even inaccessible; the southern face is of a tamer character. The sandstone varies much in character, but in general it is a fine-grained rock, composed of grains of quartz closely aggregated.

In the south-eastern corner of the county, north of Clonmel and Carrick-on-Suir, is a group of hills called Slievh-na-Man, the geological character of which is similar to that of the mountains already described: the group consists of a nucleus of clay-slate, surrounded and surmounted by sandstone.

In the centre of the county is another important range. It commences in the county of Limerick, N. of the little river Mulkerne, or Bilboa, which joins the Shannon a short distance above Limerick. At this extremity the range is known as the Doon Mountains; but as it extends N.E. into Tipperary, the most important summits are known as the Bilboa and Keeper Mountains (the latter 2100 feet high) and the Devil's Bit. It crosses the county of Tipperary in a N.E. direction, becoming narrower as it advances, and enters Queen's County and King's County, which it separates from each other, and where it is known under the designation of the Slievh Bloom. The geological character of these mountains is similar to those already described: Keeper and Bilboa and the adjacent parts of the range consist of clay-slate, generally flanked by sandstone.

Near the lower part of Lough Derg, one of the lakes through which the Shannon flows, are the Arra Mountains, a group occupying a small part of this county on the western side, and extending across the Shannon into the county of Clare (where they are known by the name of Slievh Bernagh): they consist partly of clay-slate and partly of sandstone.

The rest of the county is occupied by the floetz limestone, except a portion of the district between the southern groups of mountains (Slievh-na-Man and the Galtees) and the central range, which is occupied by the coal-field of Killenaule; and one or two small tracts on the western side of the county, where trap rocks appear interstratified with the limestone.

The coal-field of Killenaule extends about 18 miles in length from N.E. to S.W., from near the river Nore to the neighbourhood of Cashel, and about 6 miles in breadth. It is partly in this county and partly in that of Kilkenny. This coal-field forms a low range of hills, placed upon the floetz limestone, and elevated about it. The coal is of the nature of stone coal or anthracite. The coal-works have been carried on with increased activity of late years.

The principal bogs are in the eastern and central part of the county: one continuous line of bog extends from near the border of the coal-field, near Killenaule, to the south-eastern foot of the central range of hills at Roscrea, a distance of nearly 30 miles; and there are smaller detached bogs westward of this, and some in the northern part of the county.

Rivers.—The greater part of the county is comprehended in the basin of the Barrow and the Suir, two rivers which unite in Waterford Harbour. A small part on the eastern border is drained by the Minster, or King's River, a small affluent of the Nore, which itself is an affluent of the Barrow. The Nore rises in this county, but has its course chiefly in that of Kilkenny. The Suir rises N. of Templemore, on the south-eastern slope of the mountains that there cross the county, and flows by Thurles, Golden, and Cahir, to the junction of the little river Nier; after which it flows along the border of this county and Waterford, first N., and then W. by Clonmel and Carrick, below which it quits the county altogether. Its course in Tipperary may be estimated at about 76 miles. It receives a number of tributaries, most of them small. The Suir is navigable by large barges up to Clonmel.

That part of the county which lies north-west from the central chain of mountains (the Keeper, Bilboa, and Devil's Bit) belongs to the basin of the Shannon. The Shannon itself, and Lough Derg, through which it flows, skirt the north-western border for about 45 miles, being navigable throughout. The streams which flow from the north-western slope of the central chain are affluents of the Shannon, but none of them are navigable.

There are no lakes in this county; but Lough Derg is on its border. There are no navigable canals.

Agriculture.—With the exception of the mountain-ranges and bogs already noticed, Tipperary consists principally of extensive plains of rich pasture land on a calcareous subsoil. There are some very large estates, but many are of a moderate size. Tillage farms are generally small; but wheat is grown in large quantities and of fine quality. The dairies are numerous, and butter is exported to a large amount.

Divisions, Towns, &c.—Tipperary is divided into 11 baronies. It is chiefly in the united diocese of Cashel, Emly, Waterford, and Lismore, but a part is in the united diocese of Killaloe, Kilfenora, Clonfert, and Kilmacduagh. The assizes for the North Riding are held at Nenagh, and for the South Riding at Clonmel. The county returns 2 members to parliament, and one member is returned for each of the boroughs of Clonmel and Cashel.

The following are the principal towns, with the population of each in 1841:—

Ballina, a village, stands on the E. bank of the Shannon, about a mile below Lough Derg, and is connected with Killaloe, on the opposite bank of the river, by a bridge of 19 arches. Population, 774. [Clare.]

Cahir, a market-town, 9 miles W. by N. from Clonmel, is situated on both banks of the river Suir. It is a clean town, and contains many well-built modern houses. The parish church, Roman Catholic chapel, sessions-house, and bridewell, are all fine buildings for their respective uses. Cahir Castle, an extensive old seat of the Butlers, is in the town, and is in good preservation. It occupies the summit of an isolated rock on the left bank of the Suir. Cahir is a thriving town, in a rich and beautiful country. Population, 3668.

Carrick-on-Suir, a market-town, 14 miles E. from Clonmel, is situated on the N. bank of the Suir, which is navigable to the town for vessels of considerable burthen. The town consists principally of one long street, from which three smaller ones diverge northwards. It contains a court-house, fever-hospital, dispensary, union-workhouse, a church, and a large Roman Catholic chapel. On the opposite bank of the river, in the county of Waterford, is the suburb of Carrickbeg; and Carrick-on-Suir Castle, built in 1309, is also on the right bank of the river. Population of the town, 8369.

Cashel, a parliamentary borough, 17 miles N.N.W. from Clonmel, formerly the see of an archbishop, is now included in the archbishopric of Dublin and Cashel, and in the united bishopric of Cashel, Emly, Waterford, and Lismore. The town is chiefly built round the S. and E. sides of an insulated mass of limestone, called the Rock of Cashel, on which was formerly the residence of the kings of Munster, and which is now the site of a very interesting group of ruins, consisting of a round tower, the old cathedral, a castle, Cormac's chapel, and a monastery. The round tower is 56 feet in circumference at the base, and 90 feet high. The cathedral is a fine specimen of pointed gothic architecture, and contains many curious relics. The chapel of Cormac MacCulinan, king of Munster, built in 1136, is a good specimen of early Norman architecture. The cathedral, Cormac's chapel, and the castle, are all joined together. The monastery is a few yards distant. The town contains a court-house, market-house, a county infirmary, a large union-workhouse, a modern cathedral, and a large Roman Catholic chapel. The main street, and one or two outlet streets, are pretty well built and clean: the rest are narrow and dirty. Population of the town, 7036.

Clogheen, a market-town, 14 miles S.W. by W. from Clonmel, is situated on a stream called the Avon-Tar, and contains some flour-mills, a small church, and a union workhouse. Population, 2049.

Clonmel is the county town, and a parliamentary borough. [Clonmel.]

Fethard, a market-town, 9 miles N. from Clonmel, is irregularly laid out on both banks of the Clashaluin, a small stream which falls into the Anner, an affluent of the Suir. It is an ancient and decayed town, with little trade. It contains a parish church, formed out of the nave of an old church, and two Roman Catholic chapels. Population, 3915.

Killenaule, a market-town, 16 miles N. by E. from Clonmel, stands on a small stream which falls into the Anner. The town contains a small ancient church and a Roman Catholic chapel. Population, 1786.

Nenagh, a market-town, 45 miles N.W. from Clonmel, and 24 miles N.E. by N. from Limerick, is the assize-town of the North Riding of Tipperary. It stands on the river Nenagh, which flows with a circuitous course from the Keeper Mountains into Lough Derg, and consists of four streets meeting in the centre. The ruins of the castle consist chiefly of a large circular donjon or keep. The town contains a large court-house, a fever-hospital and dispensary, a church, a Roman Catholic chapel, a county gaol, and a union workhouse. Population, 8618.

Roscrea, a market-town, 45 miles N. by W. from Clonmel, stands on a stream which falls into the Brosna, and consists of several streets irregularly laid out. It is an ancient town, and contains a parish church, of which the doorway and some other parts are Norman, a square castle occupied as a barracks, a court-house, Roman Catholic chapel, and other places of public worship. Near the church is a round tower 80 feet high and 15 feet in diameter. There are also some remains of a monastery. Population of the town, 5275.

Templemore, a market-town, 35 miles N. by W. from Clonmel, is situated near the right or west bank of the Suir, and is a well-built and neat town. The church, which has a handsome tower and spire, was rebuilt about fifty or sixty years ago. There are a handsome and spacious Roman Catholic chapel, a court-house, a bridewell, barracks, a fever hospital and dispensary, and ball and news-rooms. The town is approached on all sides by avenues of ash trees. The town derives its name from the Knights Templars, who had a house there. Population, 3685.

Thurles, a market-town, 28 miles N. by W. from Clonmel, stands on the W. bank of the Suir, here

a small stream. The town has much increased of late years both in extent and trade. It contains a neat modern church, a handsome Roman Catholic chapel, a Roman Catholic college, two nunneries, a Baptist meeting-house, a good market-house, a sessions-house, a bridewell, and a dispensary. Population, 7523.

Tipperary, a market-town, 20 miles W.N.W. from Clonmel, stands near the little river Arra, which flows into the Suir, and consists of one principal street, from which smaller streets branch off at right angles. Several of the houses are well-built, and of handsome appearance: many old buildings have been taken down and new ones erected in their place, so that the town has a neat and thriving appearance. The church is a modern structure, and there is a Roman Catholic chapel. There are some remains of an Augustinian monastery, chiefly consisting of an arched gateway. The town contains a neat market-house with a news-room over it, a dispensary, a fever hospital, and a small bridewell. Population, 7370.

History.—Sir James Ware supposes that the Coriondi (Κοριόνδοι) and the Udiæ, or rather Uodiæ (Οὐοδίαι), of Ptolemæus, occupied this county and the adjacent ones to the W. and S.W. Probably the Brigantes (Βρίγαντες) occupied the S.E. parts, while the Uodiæ occupied the S.W.

In the early periods of Irish history these territories appear to have been divided between the kingdom of Thomond or North Munster, governed by princes of the Dalcassian race; and Desmond, or South Munster, held by princes of the Eoganacht or Eugenian family; the princes of which two kingdoms appear to have possessed in alternate succession the paramount dominion of Munster. Early in the ninth century Feidlim Mac-Crimthan, king of Desmond, held the paramount sovereignty of Munster. The capital of his kingdom was Cashel. His course, which was one of violence and tyranny, was marked by success: he was victorious over the chieftains of Connaught and over the king of Meath, the nominal sovereign of all Ireland. At the commencement of the 10th century the regal and sacerdotal characters were united in Cormac Mac Culinan, bishop of Cashel and king of Munster, of the Eoganacht race.

In the English invasion Henry II. (A.D. 1172) summoned an assembly of the Irish prelates and princes at Cashel, where the sovereignty of the English king was recognised, and various regulations made, increasing the power of the clergy, and more completely assimilating the practices of the Irish church to those of the church of Rome. Tipperary, or part of it at least, seems to have remained under the dominion of Donald of the sept of O'Brien, native prince of Thomond and Ormond, subject to the nominal sovereignty of the English king.

In 1185, while Prince John, afterwards King John, was in Ireland, sent over by his father, as lord of the island, the Anglo-Normans erected castles at Tipperary and Ardfinnan in this county. Donald died in 1194. The oldest part of the present cathedral of Cashel was built by him. Tipperary appears to have passed in the course of a few years afterwards into the hands of the Anglo-Normans, as it was one of the counties erected by King John (A.D. 1210), during his expedition to Ireland, at the head of a considerable army.

In the great civil war in 1642, Clonmel, Cashel, Carrick-on-Suir, Fethard, and all the other towns in Tipperary, were seized by the insurgents, or, as they were termed, the Confederates, almost at the first outbreak in the central and southern provinces. At Cashel and Fethard there were some murders committed. The Earl of Inchiquin, who commanded in Munster for the parliament, invaded the county in 1647, took Cahir by capitulation, and stormed Cashel, where he mercilessly slaughtered twenty priests and an unresisting multitude who had taken shelter in the cathedral. He levied contributions in all the neighbourhood, and was prevented from taking Clonmel only by want of provisions. When Cromwell invaded Ireland in 1649, and was opposed by the Royalists and Confederates, now united under the Earl of Ormond (to whom Lord Inchiquin, shocked at the execution of the king, had joined himself), a detachment from his army took Carrick-on-Suir, where Cromwell himself crossed the river to besiege Waterford. A body of Royalists under Lords Inchiquin and Taafe, attempting to retake Carrick, was repulsed with severe loss. Ormond with the main body of his army was about this time near Clonmel watching Cromwell, whom sickness and the approach of winter obliged to raise the siege of Waterford. About the latter end of February, 1650, Cromwell opened the campaign by taking Cahir, Cashel, Fethard, Clogheen, and other places in this or the adjacent counties; and in the course of the following April laid siege to Clonmel. This siege cost him more trouble and loss than any other part of his Irish expedition: he lost above 2000 men in a fruitless assault. However after a siege of two months the place was obliged to surrender for want of ammunition. The garrison had previously withdrawn to Waterford without Cromwell's knowledge, and the townsmen obtained good conditions, Cromwell supposing that the garrison was still in the town. In 1651 Ireton, who was after Cromwell's departure general-in-chief for the parliament, concentrated his army at Cashel, and marched to the bank of the Shannon, over which he forced a passage at Killaloe. On the restoration of royalty in Ireland, which rather preceded its restoration in England, Clonmel was one of the towns occupied by the Royalists.

TIPPOO SAIB, sultan of Mysore, was born in 1749. His father Hyder Ali Khan [HYDER ALI] procured for his son the best masters in all the sciences which are cultivated by the Mohammedans. But Tippoo, although he had acquired a taste for reading, preferred martial exercises, and in 1767, when Hyder Ali overran the Carnatic, Tippoo was entrusted with the command of a corps of cavalry. During the war with the Mahrattas, which lasted from 1775 to 1779, the left division of the Mysore army, consisting of 18,000 cavalry and 6000 regular infantry, was put under his command. The whole of the war in the Carnatic gave him opportunities of perfecting himself in the art of war; and he showed

his skill in the attack and defeat of Colonel Braithwaite, on the banks of the Kolerun, Feb. 18, 1782. A few months afterwards he was himself defeated near the Paniany, and, having then crossed the river, prepared for another engagement, when he received intelligence of the death of his father, Dec. 11, 1782. On the 20th he was at Seringapatam, and succeeded his father as Raja of Mysore. He then returned to Arcot, and assumed the command of his army; but was soon obliged to relinquish his conquests in the Carnatic, and by the end of April, 1783, he had reduced the garrison of Bednore, when General Matthews and several of the principal officers were barbarously put to death. Peace having been concluded between England and France, and a considerable reinforcement of English troops having arrived, Tippoo agreed to a treaty of peace, March 11, 1784. About the end of the year Tippoo concluded a treaty of peace with the court of Poonah. He then returned to Seringapatam, and assumed the title of Sultan, thereby throwing off all dependence on or allegiance to the Peishwa and the Great Mogul.

In 1786 he occupied himself with internal regulations; and from an inventory made at this period we find that the treasure, jewels, and other valuable articles were estimated at eighty millions sterling, besides a very large army and stores.

During 1787 and 1788 the attention of the Sultan was principally engaged in the subjection of the chiefs of Malabar.

In 1787 Tippoo sent an unsuccessful embassy to France, to stimulate the court of Versailles to a renewal of hostilities with England. In April, 1790, he invaded the territory of the Raja of Travancore, and subjected the whole of the northern district. This aggression being an infraction of the treaty of 1784 was considered by the English equivalent to a declaration of war, and Colonel Hartley was sent to the assistance of the Raja.

The English troops, under the command of General Medows, entered the Sultan's territory June 15, 1790, and speedily reduced the forts of Carur, Daraporum, and Coimbatoor. About the same time a detachment under Colonel Stuart, captured Dindigul and Paligautchery. On Jan. 19, 1791, Lord Cornwallis assumed the command of the army, and was at Arakery, within sight of the Sultan's capital May 3, but his troops had suffered a great deal from want of food and forage, and he was compelled to retreat towards Bangalore. The Mahrattas came however to his assistance, and the warfare was carried on with great success. Meantime the Sultan made a diversion towards Coimbatoor, south of Seringapatam; and Lieutenant Chalmers, with the whole of his party, were made prisoners. The skill of Tippoo enabled him to protract the war till Feb., 1792, when the allies (the English, the Mahrattas, and the troops of the Nizam) encamped in sight of Seringapatam. But it was not until General Abercromby had united his forces to those of Lord Cornwallis, and had determined to take the town by storm, that the Sultan was humbled. He agreed to give the allies one-half of his dominions, and to pay them in the course of twelve months the sum of three crores and thirty lacs of rupees (3,030,000*l.*), to restore all the prisoners, and to deliver up as hostages two of his sons, March 16, 1792. Soon after this the allies quitted the neighbourhood of Seringapatam, and Tippoo sought the means of replenishing his treasury by exorbitant taxes.

Notwithstanding the seeming tranquillity from 1792 to 1796, the Sultan was engaged in inciting all the native chiefs, as well as the French in the Mauritius, against the British power in India; but it was not until 1798 that the whole extent of his secret machinations and intrigues became known. At length, when there could be no doubt as to the intentions of the Sultan, orders were issued, Feb. 3, 1799, for the British armies and those of the allies immediately to invade his dominions. Hostilities commenced on the 5th of March; and on April 5 General Harris took a strong position opposite the west side of Seringapatam. A general attack was made May 4, 1799. The Sultan's troops fled; and finding all his own efforts fruitless, he mounted his horse, and, in endeavouring to effect his retreat, arrived at a bridge leading to the inner fort; but the place was already occupied by the English, to whom he haughtily refused to make himself known, and was shot through the head with a musket, May 5, 1799.

Tippoo, notwithstanding his extortions, was very popular. He used to pass a great portion of his time in reading, and his library, consisting of about 12,000 volumes, was well selected. About one-half of this collection is preserved at the East India House, London; the other half was left at Fort William (Calcutta), for the use of the college there.

TIPTON. [STAFFORDSHIRE.]

TIRABOSCHI, GIRO'LAMO, born at Bergamo in 1731, studied in the college of Monza, and afterwards entered the order of the Jesuits. About 1766 he was made professor of rhetoric in the university of Milan, where he wrote his first work, 'Vetera Humiliatorum Monumenta,' 1766. In 1770 he was appointed librarian to the Duke of Modena. He now applied himself to the undertaking of his great work, 'Storia della Letteratura Italiana,' Modena, 1772–1783, which he completed in eleven years. Tiraboschi's work was highly esteemed, and went through numerous editions in various parts of Italy. When it appeared, no other country of Europe had a general history of its own literature. It has been said to be deficient in criticism, but its accuracy is undisputed. The tone of Tiraboschi's remarks, especially on religious matters, is perhaps as temperate as could be expected.

The Duke of Modena, Ercole III. of Este, made him a knight and appointed him member of his council in 1780. By the suppression of the order of Jesuits, Tiraboschi had become a secular priest. In 1781 he began to publish another work of bibliography and biography: 'Biblioteca Modenese, o Notizia della Vita e delle Opere degli Scrittori natii degli Statì del Serenissimo Duca di Modena,' Modena, 1781–86. He afterwards wrote his 'Memorie Storiche Modenesi, col codice diplo-

matico, illustrato con note,' Modena, 1793, besides various other works. His voluminous correspondence is preserved in the Modena Library. Tiraboschi died at Modena in June, 1794.

TIRIDA'TES was the brother of Vologeses, king of the Parthians, that is, of Media. He first appears in history in A.D. 53, in the first war of Córbulo against Vologeses, who was compelled to desist from his designs upon Armenia in A.D. 54. In A.D. 58 however the Parthians again overran Armenia, and Vologeses ceded his conquest to his brother Tiridates, who thus became king of Armenia. Corbulo soon persuaded Tiridates to submit to the Emperor Nero, and to prefer a moderate dependence to an uncertain and dangerous independence. But when they were about to meet to settle the conditions of peace, Tiridates, being afraid of some treacherous design on the part of the Romans, broke off the negociations and renewed the war. Corbulo however defeated him at Artáxata on the Araxes, and destroyed this old capital of Armenia.

Tiridates fled to his brother, who entrusted him with a new army, with which Tiridates hoped to expel the Romans from Armenia. He attacked them on the side of Mesopotamia, but the Romans were too strong to be dislodged from their position. Tiridates listened once more to the pacific proposals of the Romans, and declared to Corbulo by his ambassadors that he was ready to submit to Nero, as a vassal-king, and that Vologeses would keep a better understanding with the Romans. Tiridates came to the camp of Corbulo (A.D. 63), took off his diadem, and placed it at the foot of the portrait of the Emperor Nero. He bound himself not to exercise the royal authority till he had again received his diadem from the hands of the emperor. Tiridates visited Rome in A.D. 66; but nothing more is known of him.

TIRLEMONT. [BRABANT, SOUTH.]

TIRYNS, an ancient city of Árgolis, in the Peloponnésus, at no great distance from the head of the Argolic Bay, now the Gulf of Napoli di Romania. According to a legend it was built by Prœtus, an ancient king of Argolis, who in the construction of the citadel employed masons from Lycia, who were called Cyclópes. The Greeks attributed most architectural works which were characterised by rude massiveness and great antiquity to the Cyclopes, and such works were described as Cyclopean. Homer ('Iliad,' ii. 559) calls Tiryns the 'walled,' or rather the 'wally' Tiryns: and Pausanias (ii. 25) describes the remains as they existed in the second century of our æra. No cement was used in these constructions, which were the first rude attempt at building with stone among the Pelasgic Greeks.

The ruins of Tiryns are thus described by Col. Leake, in his 'Morea,' vol. ii., p. 350:—'They occupy the lowest and flattest of several rocky hills, which rise like islands out of the level plain. The length of the summit of that of Tiryns is about 250 yards, the breadth from 40 to 80; the height above the plain from 20 to 50 feet; the direction nearly north and south. The entire circuit of the walls still remains more or less preserved. Some of the masses of the stone are shaped by art, some of them are rectangular; but these are probably repairs, and not a part of the original work described by Pausanias. The finest specimens of the Cyclopean masonry are near the remains of the eastern gate, where a ramp, supported by a wall of the same kind, leads up to the gate. The ruined wall of the fortress still exists to the height of 25 feet above the top of the ramp; but this is the only part in which the walls rise to any considerable height above the table summit of the hill within the fortress. On one side of this gateway I measured a stone of 10 feet 6 in. by 3 feet 9 in. by 3 feet 6 in. Here the wall is 24½ feet in thickness; in other parts from 20 to 23. But the principal entrance was not here, I think, but on the southern side, adjacent to the south-east angle of the fortress, where a sloping approach from the plain is still to be seen, leading to an opening in the walls.' Besides Leake's 'Morea,' see also Sir W. Gell's 'Itinerary of the Morea and Argolis,' and Dodwell's 'Classical Tour,' ii., p. 250.

TISCHBEIN, JOHANN HEINRICH, *the Elder*, was the son of a baker of Hayna near Gotha, where he was born in 1722. He was first apprenticed to an uncle, who was a locksmith: but he displayed so much talent for drawing that an elder brother placed him, in his fourteenth year, with a paper stainer and decorator in Cassel, named Zimmermann. He received also some instruction from Van Freese, the court painter at Cassel. By the assistance of Count Stadion he was enabled, in 1743, to visit Paris, where he remained five years with Charles Vanloo. From Paris he went to Venice, and there studied eight months with Piazzetta: from Venice he went to Rome; and in 1751 he returned to Cassel, where, in 1752, he was appointed cabinet painter to the landgrave, and afterwards director of the Academy of Cassel, and a member of the Academy of Bologna. He died in 1789. A biographical notice of Tischbein was published in Nürnberg in 1797, by J. F. Engelschall. In that work there is a list of 144 of his historical pieces, of which the following have been considered among the best:— the Resurrection of Christ, painted in 1763, for the altar of St. Michael's Church at Hamburg; Hermann's Trophies after his Victory over Varus in the year 9, in the palace of Pyrmont, 1768; ten pictures of the Life of Cleopatra, painted in the palace of Weissenstein, 1769–70; sixteen from the life of Telemachus, in the palace of Wilhelmsthal. He also etched several plates after his own pictures. Tischbein painted in the French style; his colouring was a mixture of the French and the Venetian, and in large compositions very gaudy, but his drawing and chiar'oscuro were very good. His elder daughter Amalia was a clever painter; she was elected, in 1780, a member of the Academy of Cassel.

TISCHBEIN, JOHANN HEINRICH WILHELM, *the Younger*, the youngest son of Johann Conrad Tischbein, and nephew of the preceding, was born at Hayna in 1751. He was instructed by his uncle Johann Heinrich at Cassel in historical painting, and he afterwards studied land-

scape with his uncle Johann Jacob at Hamburg. In 1770 he went to Holland, and in 1772 returned to Cassel; he visited also Hanover and Berlin, and executed many works in all these places. In 1779 he left Cassel for Italy, but he spent about two years in Zürich. In 1781 Tischbein arrived in Rome. His first original picture was Hercules choosing between Vice and Virtue, after which he painted his celebrated picture of Conradin of Suabia, now in the palace of Pyrmont. In 1787 he went to Naples, and painted the portrait of the crown-prince for the queen, who presented Tischbein with a valuable snuff-box and 200 ducats. In 1790 he was appointed director of the Academy of Naples, with a salary of 600 ducats per annum, which however he lost in 1799, at the breaking out of the revolution. He then left Naples, and after four months of great danger, the vessel in which he embarked being driven upon the coast of Corsica, and captured by a French ship of war, Tischbein at last reached Cassel in safety. During his residence in Naples he published, in 1796, a remarkable work upon animals, in two parts, folio, entitled 'Têtes des Différents Animaux, dessinés d'après Nature, pour donner une idée plus exacte de leurs caractères.' After his return to Germany he lived principally at Hamburg and at Eutin in Oldenburg near Lübeck; the following are among his most celebrated works:—Ajax and Cassandra, 1805; 'Let the Little Children come unto me,' painted in 1806, for the altar of the church of St. Angari at Bremen; and Hector taking leave of Andromache, 1810.

In Göttingen in 1801–4 he published in royal folio his favourite work on Homer, 'Homer, nach Antiken gezeichnet von Heinrich Tischbein, Direktor, &c., mit erläuterungen von Chr. Gottl. Heyne,' i.–vi., each number containing 6 plates. His drawings for Sir W. Hamilton's second collection of vases, published at Naples from 1791, in 4 vols. folio, amount to 214. As a painter his drawing was correct, and his expression and colouring good, and he excelled in drawing animals. He died in 1829. There were many other artists of this family, of various degrees of merit, but they are unknown beyond their own circles.

TISSOT, SIMON ANDREW, was born at Lausanne, in the canton de Vaud, in 1728. He studied first at Geneva, and then at Montpellier, from 1746 to 1749, where he took his degree of doctor of medicine. He then returned to Switzerland and settled at Lausanne, at the college of which place he became professor of medicine, and published many medical works. These works spread his reputation rapidly through Europe, and he was offered various important situations at different foreign courts and universities, all which he declined. However, in 1780, he could not resist the solicitations of the Emperor Joseph II., who conferred on him the professorship of clinical medicine at the university of Pavia. There soon after broke out in the province an epidemic bilious fever, as to the treatment of which the physicians of the place differed. It was agreed that Tissot's directions should be followed; and his treatment was so successful, that the students caused a marble inscription in his praise to be placed under the portico of the school. After holding his professorship for three years, Tissot resigned. Tissot died in his native land, unmarried, June 15, 1797. A complete list of his works is given in the 'Biographie Médicale:' of these the following are the most interesting: 'Dissertatio de Febribus Biliosis, seu Historia Epidemiæ Lausanensis anni 1755,' Lausanne, 8vo., 1758; 'Avis au Peuple sur sa Santé,' Lausanne, 12mo., 1761; 'De Valetudine Litteratorum,' Lausanne, 8vo., 1766. There is a complete edition of his works by J. N. Hallé, in 11 vols. 8vo., Paris, 1811.

TISSUES, ORGANIC. The chemical constitution of the various organic tissues, whether of animals or of plants, or such as are common to both, are described under the respective names of the substances which compose those tissues, or are the products of their organisation. [ALBUMEN; BLOOD; CELLULAR TISSUE; DEXTRINE; FIBRIN; MUSCLE; STARCH; SUGAR; &c. See also FOOD and TISSUES, VEGETABLE.]

TISSUES, VEGETABLE. The various organs of plants, as the leaves, flowers, roots, stem, &c., are composed of certain ultimate structures, which are called Elementary Organs or Vegetable Tissues. Most parts of a plant, when cut into, present to the naked eye an almost perfectly homogeneous character; and it is only by calling to our aid the microscope that we can distinguish the various structures of which they are composed. On taking a leaf or a portion of the stem of one of the higher plants, and submitting it to the microscope, it will be found to consist—1, of a thin transparent homogeneous membrane, which is arranged in the form of cells or cylindrical tubes; 2, of fibres, which are arranged in a spiral form in the interior of the cells or tubes; and 3, a fluid of varying density, filling the cells and existing between them, and containing in it globules of various sizes and kinds. These parts constitute what are known respectively as Elementary Membrane, Elementary Fibre, and Organic Mucus. Elementary membrane, and the fluid from which it is developed, are the only two which are constantly present in all plants. Fibre is only found in the higher forms of plants.

The primary form in which organisation appears is that of a simple cell containing or surrounded by a fluid; and however complicated may be the forms which the tissues of plants may assume, they mostly originate in this primitive form.

The development of the cell itself is a subject of much interest, and great light has been thrown on this obscure department of physiology by the researches of Dr. Schleiden. It was long since observed by Robert Brown that in the cells of the tissue of orchidaceous plants there was an opaque spot, or areola, in the interior of the cell. Schleiden, finding this spot very constant in the cells of certain plants, concluded that it must have some important relation to them, and submitted it to a very strict examination. He found that these bodies were the original particles from whence the cells were formed; hence he called them cytoblasts.

The increase of the bulk and size of plants de-

pends upon the development, in the interior of the old or originally-formed cells, of several new cytoblasts, each of which develops a new cell, and causes by its presence the absorption or destruction of the old one.

But all the parts of plants do not consist of simple cells; the cells become elongated, forming fibrous or woody tissue, and spiral fibres are generated both in cells and tubes, constituting the various forms of fibro-cellular and vascular tissue.

The various forms of vegetable tissue found in the different organs of plants are—

1. *Fibrous.* Tissue in which elementary fibre is alone apparent.

2. *Cellular.* Tissue composed of membrane in the form of cells whose length does not greatly exceed their breadth.

3. *Vascular.* Tissue composed of cylindrical tubes of membrane continuous or overlying each other at their ends.

4. *Fibro-Cellular.* Tissue composed of cells, in the inside of which fibres are generated.

5. *Fibro-Vascular.* Tissue composed of tubes, in the inside of which one or more spiral fibres are more or less perfectly developed.

Fibrous Tissue.—Although the development of fibre independent of membrane is still undecided, many of the parts of plants exhibit fibres divested of membrane. Fibres spirally arranged and adhering together by vegetable mucus only, which mucus is dissolved by the application of water, were discovered by Brown, in the seed-coat of *Casuarina*, and by Lindley, in the same position in *Collomia linearis*. Fibres not assuming a spiral form, and independent of cells or tubes, have been described by Purkinje. The fibre in all cases is very minute, varying from $\frac{1}{2000}$ to $\frac{1}{10000}$ of an inch in diameter. It is most commonly transparent and colourless, but in some cases has been observed of a greenish colour.

Cellular Tissue consists of cells or cavities, which are closed on all sides, and are formed of a delicate, mostly transparent, membrane developed from a cytoblast. It is present in the whole vegetable kingdom; and all the lower forms of plants, constituting the class Acrogens, are composed entirely of it, and have hence been called *Cellulares*. In the higher plants it is most abundant in fruits and succulent leaves. It exists in larger quantity in herbs than trees, and the younger the plant the more it abounds, and it constitutes the entire structure of the embryo.

Contents of Cells.—The vesicle of cellular tissue when it rises from its cytoblast is a thin transparent membrane, which as it enlarges becomes thickened from within by the appropriation of proper nutriment which is contained in the cell. This cell in the early stages of its growth is filled with a fluid, at first clear, but afterwards opalescent from the development in it of minute granules. These granules are of various shapes and sizes, and always excessively minute. In their early stages they possess the characters of starch, more particularly the property of assuming a blue colour when brought in contact with tincture of iodine. In the older cells many of the granules lose the

character of starch, and possess other properties. Some of them, and these more minute than those of starch, are not coloured by iodine, and are soluble in alcohol, and partake of a resinous character. They give the peculiar colour to the elaborated sap, whatever that may be, and in plants with milky juices constitute the caoutchouc which they yield. They seem also to be the constituents of the volatile oils, resins, balsams, gums, &c., that plants yield. Another set of globules are also found present in old cells, and these constitute what is called *Chlorophyl*, or *Chromule*, and exist especially in the cells of plants on their surface, giving to them their peculiar colours. It is from the remaining granules of starch that the cells are nourished. Previous to being appropriated by the walls of the cell they are converted into a substance called by Meyen vegetable jelly. It is from this substance, varying in almost every family of plants, that the cells are thickened, by which the delicate membrane in many cases becomes excessively hard, as in the stones of many fruits, the seeds of certain Macrocarpa, and the wood of many trees. In simple cellular tissue and in woody tissue this material is applied equally to the whole surface of the cell, forming regular layers: in the fibro-cellular and fibro-vascular tissues it is appropriated in the form of fibre.

Another class of bodies found in the interior of cells, and which appear to have nothing to do with the nutrition of the plant, are those crystalline bodies called Raphides. They occur singly or in bundles, and have an acicular form. These crystals were first observed in the proper juices of plants, and have been subsequently found in all parts of plants where cellular tissue exists. Quekett says they are four-sided prisms, but not always right-angled. The proportion in which they exist in plants is sometimes very great. In some species of *Cataceæ*, according to Quekett, the crystals equal the weight of the dried tissue. In most plants these crystals are composed of either oxalate or phosphate of lime. In *Chara* crystals of carbonate of lime occur in great abundance on the outside of the tissue, but they do not occur in the interior parts of the plant. Silica is a very prominent constituent of the *Graminaceæ*, but is seldom found crystallised. It gives the hardness to the epidermis of the Dutch rush, and is secreted in large quantities in the joints of the stem of the bamboo, and is used as an article of commerce under the name of *Tabasheer*.

Growth, &c.—The vesicles of cellular tissue are very small, and cannot be distinguished with the naked eye; and in fact all investigations on the structure, development, and functions of the tissues of plants, can only be conducted with the aid of the microscope. The measurements of the cells give them a size varying from $\frac{1}{30}$th to the $\frac{1}{1000}$th of an inch in diameter. In the lower tribes, as in the *Fungi*, their generation is very rapid, and it is well known that mushrooms, puff-balls, &c., will attain a great size in the course of a single night. The force too with which they are generated is very great, and there are many well-authenticated instances of agarics springing up beneath pavements and displacing stones of great weight and size.

It frequently happens that the walls of the cells are not accurately applied to each other, and consequently spaces of various kinds occur between the cells. These are called Intercellular Passages. These are very well seen in the parenchyma of the stem of the Iris and Hyacinth, and *Heracleum*.

Another kind of intercellular formation are the *Air-Cells*, which are large cavities formed in the tissue of plants, and whose walls are entirely formed of cellular tissue. They may be very distinctly divided into two kinds, the regular and the irregular. The regular exist under the epidermis of many plants, and vary in size, but have in all cases a regularity of structure, their sides being formed of equal-sized cells of cellular tissue. They may be seen in the leaf-stalk of *Calla Æthiopica*, the stem of *Œnanthe Phellandrium*, and the petioles of *Nymphæa*. They are very common in water-plants. They are always filled with air in these plants, and serve as a means of buoying them up in the water. The irregular air-cells are found in all plants; they arise from the growth of the plant tearing asunder the cellular tissue, or from a deficient development or even the absorption of this tissue in particular directions. They may be seen in the stem of the fronds of the *Aspidium Filix Mas*, of *Hippuris* and *Equisetum*, and in nearly the whole of the family *Umbelliferæ*.

The other organs which are formed by and found in the midst of the cellular tissue are the *Sap-Cells* and *Glands*. The sap-cells consist of enlarged cells of tissue, varying much in size, but always filled with elaborated sap. They are found in the skin of the fruit of the citron, pomegranate, &c. The glands are composed of cells pressed together, and assuming a variety of forms. When examined, these cells are found to contain in many instances the resin, gum, oil, &c., which give to the plant some of its peculiar physical properties.

Vascular or *Tubular Tissue* consists of continuous tubes of simple membrane, and comprehends the woody and the laticiferous tissues. On the one hand they are distinguished by their length from the forms of cellular tissue, and on the other hand by their plane membrane from those tissues of which fibre forms a constituent element. *Woody Tissue* is found abundantly in the wood, and especially the liber, of all plants. It is composed of very long, thin, tough, transparent, membranous tubes. The tubes of woody tissue are very tough, and will resist considerable force without breaking. It is on this account that they are used extensively in the manufacture of cloths of various kinds. The plants used most commonly for this purpose are the hemp and flax. Woody tissue gives firmness and tenacity to the plant, and assists in conveying the sap from the roots to the leaves. *Laticiferous Tissue* consists of tubes which are mostly branched and anastomosing; their walls are exceedingly delicate in young plants, and thicker in old ones; and they are characterised by conveying a fluid called the *Latex*, which differs from the sap in other parts of the plant. [SAP.] *Fibro-Cellular Tissue* consists of cells formed of membrane, in the inside of which fibre is developed. The fibre in these cells varies in its position and form. *Fibro-Vascular Tissue* consists of tubes, in the inside of which spiral fibres are generated. The tubes consist of a very delicate membrane, which is mostly cylindrical; it may however assume a prismatical form when the tubes are in bundles and closely pressed together, as in ferns and many monocotyledonous plants. The fibres generated in this tissue are mostly compressed, and wind up the sides of the tube in a spiral form.

Function.—The functions of the tissues of vegetables are not so varied as their forms have led botanists to suppose. As a summary of them we give the following. In the simple cell we have the type of all the other tissues, and in the lowest forms of plants it alone performs all the functions of the higher plants. The cell of the *Ustilago* absorbs nutriment from without: this nutriment undergoes the changes that fit it for becoming a part of the structure of the cell. This is the process of nutrition. Within this cell another is generated, which is capable of performing the same functions as its parent. This is reproduction. As we ascend in the scale of organisation of plants, the structure becomes more complicated. Cells are accumulated together: some simply absorb sap, others expose the sap to the atmosphere; whilst others separate peculiar secretions, and another set are employed as the depositaries of these secretions. As the functions of the plant become more localised in the organs called leaves and flowers, tissues strong enough to bear them up in the air are required, and the cells are elongated and strengthened by an increase of thickness in their membrane, and woody tissue is formed. Where the same objects are required, and at the same time space for a large quantity of fluid to pass through the cells, fibre is generated within the membrane; and for this reason fibro-cellular tissue and especially fibro-vascular tissue is found abundant in succulent plants, and in those which require a large supply of moisture. These tissues are absent or very small in dry plants, as well as those which are constantly immersed in water. In the higher plants the conveyance of the prepared juices from one part of the plant to another is provided for by the laticiferous tissue. All the tissues of plants partake more or less of the functions of the simple cell, which, as the fundamental form of vegetable organisation, performs in all cases the most important functions. It is not so much by a difference in the form as by a difference in the function of particular cells that the complicated organs of the highest plants are distinguished from one another.

TITA'NIUM. This metal was first recognised by Mr. Gregor, in 1791, as a distinct substance; he detected it in a black sand found in the bed of a rivulet in Cornwall. The form of the crystals of this metal is the cube; their colour resembles that of bright copper; they are sufficiently hard to scratch rock-crystal, and their specific gravity is 5.3. Titanium is acted on by very few acids. For fusion an extremely high temperature is required. When strongly heated with nitre, titanium is oxidised and rendered soluble in hydrochloric acid, and it is precipitated from solution by the alkalies in the state of a white oxide.

The principal minerals known to contain tita-

nium are—pyrochlore; polymignite; zirconia; anatase, or protoxide of titanium; titanite, titanic acid, or peroxide of titanium; brookite; many varieties of titaniate of iron, and titaniferous iron-sand; the titaniates of manganese, zirconia, and cerium; and the silico-titaniate of lime. Most of these minerals occur in crystalline forms, but some of them in grains, and others amorphous.

Titanium and *Oxygen* combine to form two oxides: the *Protoxide* ($T^1 O^1$) appears sometimes as a deep purple powder, and sometimes as a black, earthy, insoluble mass; the *Peroxide*, or *Titanic Acid* ($T^1 O^2$), is quite white, very infusible, and after it has been heated is soluble only in hydrofluoric acid. Its acid powers are feeble; but it combines with alkalies and metallic oxides, forming salts which are termed *Titaniates*. *Chlorine* and *Titanium* combine, when the gas is passed over metallic titanium at a red heat, to form the *Chloride* ($T^1 Chl^2$). It is a colourless transparent fluid, and boils at a little above 212°, is volatilised and condenses unchanged. When exposed to the air it deliquesces, and when a few drops of it are mixed with an equal bulk of water, combination takes place with considerable violence and the evolution of intense heat. Tincture of galls, when added to a solution of titanic acid, occasions an orange-red colour.

The other compounds of titanium are but little known.

TITHES are the tenth part of the increase yearly arising from the profits of lands, the stock upon lands, and the personal industry of the inhabitants, and are offerings payable to the church, by law. Under the Jewish system, the tenth part of the yearly increase of their goods was due to the priests. (Numbers, xviii. 21; Deut., xiv. 22; Levit., xxvii. 30, 32.)

In the earliest ages of the Christian church, offerings were made by its members at the altar, at collections, and in other ways; and such payments were enjoined by decrees of the church, and sanctioned by general usage. For many centuries however they were voluntary. In England, the first instance of a law for the offering of tithes was that of Offa, king of Mercia, towards the end of the eighth century. He first gave the church a civil right in tithes, and enabled the clergy to recover them as their legal due. The law of Offa was at a later period extended to the whole of England by King Ethelwulph. (Prideaux, 'On Tithes,' 167.)

At first, though every man was obliged to pay tithes, the particular church or monastery to which they should be paid appears to have been left to his own option. In the year 1200 however Pope Innocent III. directed a decretal epistle to the Archbishop of Canterbury, in which he enjoined the payment of tithes to the parsons of the respective parishes. This parochial appropriation of tithes has ever since been the law of England. (Coke, 2 'Inst.,' 641.)

The tithes thus payable were of three kinds—*prædial*, *mixed*, and *personal*. *Prædial tithes* are such as arise immediately from the ground, as grain of all sorts, fruits, and herbs. *Mixed tithes* arise from things nourished by the earth, as colts, calves, pigs, lambs, chickens, milk, cheese, and eggs. *Personal tithes* are paid from the profits arising from the labour and industry of men engaged in trades or other occupations; being the tenth part of the clear gain, after deducting all charges. (Watson, 'On Tithes,' c. 49.)

Tithes are further divided into *great* and *small*. The *great tithes* consist of corn, hay, wood, &c.; the *small tithes* consist of the prædial tithes of other kinds, together with mixed and personal tithes. The distinction is of material consequence, as great tithes belong to the rector of the parish, and small tithes to the vicar.

Tithes were originally paid in kind, that is, the tenth wheat-sheaf, the tenth lamb or pig, as the case might be, belonged to the parson of the parish as his tithe. The inconvenience and vexation of such a mode of payment are obvious; and sometimes the owner of land would enter into a composition with the parson or vicar, with the consent of the ordinary and the patron of the living, by which certain land should be discharged from tithes, on other land being conveyed for the use of the church, or compensation being made. Such compositions however were often injurious to the church by reason of an insufficient value being given for the tithes. The acts 1 Eliz., c. 19, and 13 Eliz., c. 10, were accordingly passed, which disabled archbishops, bishops, colleges, deans, chapters, hospitals, parsons, and vicars, from making any alienation of their property for a longer term than twenty-one years or three lives. In order to establish an exemption from tithes on the ground of a real composition, it is therefore necessary to show that such composition was made before the statutes of Elizabeth. Since that time compositions have rarely been made, except under the authority of private acts of parliament.

Another method of avoiding the payment of tithes in kind was by a *modus decimandi*, commonly called a *modus*. This consists of any custom in a particular place, by which the ordinary mode of collecting tithes has been superseded by some special manner of tithing.

A large portion of the land of England and Wales is tithe-free. Some has been exempted under real composition, and some by prescription, which supposes a composition to have been made. The most frequent ground of exemption is that the land once belonged to a religious house, and was then tithe-free. The act 31 Hen. VIII., c. 13, which dissolved several of the religious houses, continued the discharge of their lands from tithes, though in the possession of the king or any other person by grant from the crown; and, in consequence of this, the lands of many laymen which were granted by the crown are tithe-free, and the right to tithe and the property in many rectories are vested in laymen. Many monasteries had previously been dissolved by act of parliament, but as no such clause as that contained in the 31 Hen. VIII. had been introduced into other acts, the lands of the monasteries dissolved by them became chargeable with tithes. The hardships and injustice of tithes upon the agriculturist are well described by Dr. Paley:—'Agriculture is discouraged by every constitution of landed property which

lets in those who have no concern in the improvement to a participation of the profit. Of all institutions which are in this way adverse to cultivation and improvement, none is so noxious as that of tithes. A claimant here enters into the produce who contributed no assistance whatever to the production. When years perhaps of care and toil have matured an improvement; when the husbandman sees new crops ripening to his skill and industry; the moment he is ready to put his sickle to the grain, he finds himself compelled to divide his harvest with a stranger.' ('Moral and Political Philosophy,' chapter xii.)

Tithes are payable not only to spiritual persons, but to lay impropriators; they have been the subject of innumerable bargains; land has been sold at a higher price on account of its exemption from tithe; the value of the patronage of the greater portion of the livings of this country is dependent upon the existing liability of land to tithes; in short, the various relations of society have been for centuries so closely connected with the receipt and payment of tithes, that to have abolished them would have been injustice to many, and no advantage to the community; for the whole profit would immediately have been enjoyed by those whose lands were discharged from payments to which they had always been liable, and subject to which they had most probably been purchased.

The principle of the commutation of tithes, was first proposed to be applied to Ireland. In addition to the common evils of a tithe system, that country was labouring under another. The mass of the people, who are Roman Catholics, were paying tithes to a Protestant clergy. Resistance to the payment of tithes had become so general that a commutation was deemed necessary for the safety of the church of Ireland. It was recommended by committees of both houses of parliament in 1832, but not finally carried into effect until 1838.

The statutes for the general commutation of tithes in England are the 6 & 7 Will. IV., c. 71, the 7 Will. IV. and 1 Vict., c. 69, the 1 & 2 Vict., c. 64, the 2 & 3 Vict., c. 32, and the 5 & 6 Vict., c. 54. Their object is to substitute a rent-charge, payable in money, but in amount varying according to the average price of corn for seven preceding years, for all tithes, whether payable under a *modus* or composition, or not. A voluntary agreement between the owners of the land and of the tithes was first promoted, and in case of no such agreement a compulsory commutation was to be effected by commissioners. In case of dispute, provision was made for the valuation and apportionment of tithe in every parish. The rent-charge was to be thus calculated: the comptroller of corn returns is required to publish in January the average price of an imperial bushel of British wheat, barley, and oats, computed from the weekly averages of the corn returns during seven preceding years. Every rent-charge is to be of the value of such number of imperial bushels and decimal parts of an imperial bushel of wheat, barley, and oats, as the same would have purchased at the prices so ascertained and published, in case one-third of such rent-charge had been invested in the purchase of wheat, one-third in barley, and the remainder in oats. For example, suppose the value of the tithe of a parish to have been settled by agreement or by award at 300*l.*, and that the average price of wheat for the seven preceding years had been 10*s.* a bushel, of barley 5*s.*, and of oats 2*s.* 6*d.*; the 300*l.* would then represent 200 bushels of wheat, 400 bushels of barley, and 800 bushels of oats. However much the average prices of corn may fluctuate in future years, a sum equal in value to the same number of bushels of each description of corn, according to such average prices, will be payable to the tithe-owner, and not an unvarying sum of 300*l.* The quantity of corn is fixed, but the money payment to the tithe-owner varies with the septennial average price of corn. Land not exceeding 20 acres may also be given by a parish, on account of any spiritual benefice or dignity, as a commutation for tithes to ecclesiastical persons, but not to lay impropriators. (6 & 7 Will. IV., c. 71, s. 26–28.)

We must not omit to mention an improvement in the mode of recovering tithes, consequent upon the commutation. There were formerly various modes of recovery, in the ecclesiastical as well as in the civil courts, and before justices of the peace. The present mode of recovering the rent-charge, if in arrear, is by distraining for it upon the tenant or occupier, in the same manner as a landlord recovers his rent; and if the rent-charge shall have been forty days in arrear, possession of the land may be given to the owner of the rent-charge until the arrears and costs are satisfied.

TITHING (*Tithinga;* from the Saxon, *Theothunge*) is an ancient division of land in England under the Saxon kings. The whole country is said to have been divided into tithings and hundreds by Alfred the Great. The tithing was a district containing ten heads of families; the hundred comprised ten tithings, or one hundred heads of families. Every tithing had its chief man annually appointed to preside over the rest, who was called the tithing-man or borsholder, and sometimes the headborough or borough's elder. Each of these little communities was bound to keep the peace within their own jurisdiction, and the members were responsible for each other. No man was allowed to abide in England above forty days without being enrolled in some tithing. Although the institution has long ceased, the name and division are still retained in many parts of England.

TITIAN. [Vecellio.]

TITLARKS, or more properly *Pipits*, genus *Anthus*, a group of birds separated by Bechstein from the true Larks [Larks], and elevated by Mr. Yarrell into a family, *Anthidæ*. The Prince of Canino and Mr. G. R. Gray both place the *Pipits* among the *Motacellinæ*.

Mr. Yarrell, in his 'British Birds,' observes that it would assist correct definition, if, among ourselves, the term *Titlark* could be discontinued entirely; 'the Tree Pipit being called the Titlark by some, the Meadow Pipit a Titlark by others; and round the sea-coast, where the Rock Pipit is generally the most frequent of the three, that is also called Titlark.'

The following species are British:—

The Tree Pipit, *Anthus trivialis;* the Meadow Pipit, *Anthus pratensis;* the Rock Pipit, *Anthus obscurus* (*Anthus petrosus*, Flem., Jen.; *Anthus aquaticus*, Selby, Gould; *Alauda obscura*, Auct.); and Richard's Pipit, *Anthus Ricardi*.

The Tree Pipit is a summer visitor, only arriving in our well-wooded enclosures towards the end of April. The male generally begins his agreeable song from the top of a bush or an upper branch of some 'hedge-row elm.' From his perch he rises into the air, his wings shivering, till he has reached an elevation about as high again as the tree from which he started. As soon as he has attained his greatest height he poises his wings, spreads his tail, and slowly descends, singing all the while, to the same station whence he rose, or the top of some neighbouring tree. The nest, placed generally on the ground, is framed of moss, root-fibres, and withered grass, lined scantily with bents and hairs. The eggs, four or five in number, vary much in colour in different nests. This bird must not be confounded with the Wood-Lark (*Alauda arborea*).

Tree Pipit (*Anthus trivialis*).

The Meadow Pipit remains with us throughout the year, and is the smallest and most common species, its total length being 6 inches only. It haunts heathy and hilly districts, as well as meadows and marsh-lands. Mr. Yarrell thus describes its habits:—'When progressing from place to place, the flight of this bird is performed by short unequal jerks; but when in attendance on its mate and undisturbed, it rises with an equal vibratory motion, and sings some musical soft notes on the wing, sometimes whilst hovering over its nest, and returns to the ground after singing. Occasionally it may be seen to settle on a low bush; but is rarely observed sitting on the branch of a tree, or perched on a rail, which is the common habit of the Tree Pipit. The Meadow Pipit, when standing on a slight mound of earth, a clod, or a stone, frequently moves his tail up and down like a wagtail; and Mr. Neville Wood mentions that he has heard him sing while thus situated on or very near the earth. The Meadow Pipit seeks its food on the ground, along which it runs nimbly in pursuit of insects, worms, and small slugs.

Nest on the ground, generally among grass, made of dried bents on the outside, with a lining of finer ones and a few hairs: eggs from four to six, reddish brown mottled with darker tints.

TITLES OF HONOUR are designations which certain persons are entitled to claim in consequence of possessing certain dignities or stations. They vary in a manner corresponding to the variety of the dignities. Thus Emperor, King, Czar, Prince, are titles of honour.

The five orders of nobility in England are distinguished by the respective titles of Duke, Marquis, Earl, Viscount, and Baron.

The orders of nobility in other European countries differ little from our own. They have their Dukes, Marquises, Counts, Viscounts, and Barons.

Another dignity which brings with it the right to a title of honour is that of knighthood. The Baronet, which is a new dignity, originated in the reign of James I.

Besides these, there are the ecclesiastical dignities of Bishop and Archbishop. It is also usual to bestow on all persons who are admitted into the clerical order the title of Reverend, a title which was formerly given to others quite as appropriately, to judges for instance.

There are also academical distinctions which are of the nature of titles of honour. Municipal offices have also titles accompanying them; and in the law there are eminent offices the names of which become titles of honour to the possessors of them, and which bring with them the right to certain terms of distinction.

All titles of honour appear to have been originally names of office. The Earl in England had in former ages substantial duties to perform in his county, as the sheriff (the Vice-Comes or Vice-Earl) has now; but the name has remained now that the peculiar duties are gone, and so it is with respect to other dignities.

Some of these dignities and the titles correspondent to them are hereditary. So were the eminent offices which they designate in the remote ages, when there were duties to be performed. Hence hereditary titles.

The distinction which the possession of titles of honour gives in society has always made them objects of ambition. Such titles exist even in democratical states, as in the United States of North America; but they are only temporary and annexed to certain offices, as that of President.

TITMICE, *Paridæ*, a natural family of Perching Birds. [INSESSORES.]

Mr. Vigors places the Titmice in his family *Pipridæ*, order *Dentirostres*. Mr. Swainson regards the Titmice as a sub-family of *Sylviadæ*, and Mr. Yarrell considers the *Paridæ* to take an intermediate station between the *Sylviadæ* and the *Ampelidæ*, the latter being represented by the Bohemian Wax-Wing. [BOMBYCILLA.]

Mr. G. R. Gray ('List of the Genera of Birds') places the sub-family *Parinæ* between *Accentorinæ* and *Sylvicolinæ* in his family *Sylviadæ*, and enumerates the following genera:—

Ægithalus, Vig.; *Melanochlora*, Less.; *Parus*, Linn.; *Megistina*, Vieill.; *Tyrannulus*, Vieill.; *Sphenostoma*, Gould; *Calamophilus*, Leach; *Orites*, Macgr. (*Mecistura*, Leach; *Acredula*, Brehm—*Long-Tailed Titmouse*); *Parisoma*, Sw.; *Psaltria*, Temm.; *Ægithina*, Vieill.; *Hylophilus*, Temm.

In this article we shall confine ourselves to those

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cognate forms which are vernacularly known as *Titmice*.

European Titmice.

The following species are found in Europe :—

The Great Tit, *Parus major;* the Sombre Tit, *Parus lugubris;* the Siberian Tit, *Parus Sibericus;* the Toupet Tit, *Parus bicolor;* the Azure Tit, *Parus cyaneus;* the Blue Tit, *Parus cæruleus;* the Coal Tit, *Parus ater;* the Marsh Tit, *Parus palustris;* the Crested Tit, *Parus cristatus;* the Long-Tailed Tit, *Parus Caudatus* of authors (genus *Orites*); the Bearded Tit, *Parus biarmicus* (genus *Calamophilus*); the Penduline Tit, *Parus pendulinus* of authors (genus *Ægithalus*).

Of these the *Great Tit*, the *Blue Tit*, the *Crested Tit*, the *Coal Tit*, the *Marsh Tit*, the *Long-Tailed Tit*, and the *Bearded Tit*, are British.

The Great Tit, the Blue Tit, the Coal Tit, and the Marsh Tit, are too well known to need description. White, in his 'Natural History of Selborne,' has sketched their habits and manners with great felicity. (See also Gould's 'Birds of Europe;' Yarrell's 'British Birds;' Knapp's 'Journal of a Naturalist,' &c.)

Of the less familiar species the following require some notice :—

1. The *Long-Tailed Titmouse.* This species is the *Pendolino, Paronzino, Codibugnolo,* and *Paglia in Culo,* of the Italians; *Mésange à la longue Queue* and *Perd sa Queue* of the French; *Langschwänzige Meise, Schwanzmeise,* and *Belzmeise Pfannenstiel* of the Germans; *Bottle Tit, Bottle Tom, Long-Tailed Farmer, Long-Tailed Mag, Long-Tailed Pie, Poke Pudding, Huckmuck,* and *Mum-Ruffin,* of the British.

Long-Tailed Titmouse (*Parus caudatus*). Male and Female.

Geographical Distribution.—Siberia, Russia, Japan. The whole of Europe. England, Scotland (near Edinburgh at least), and Ireland.

The Long-Tailed Titmouse feeds upon insects, their larvæ and eggs, and displays great activity; it frequents copses, hedge-rows, orchards, and large gardens, and builds a beautiful ball-like nest, with a lateral aperture. The young brood follow their parents during the winter, and when flitting from bush to bush, or from tree to tree, appear, from the slimness of their bodies and the length of their tails, like so many darts cutting through the air. Mr. Yarrell gives us an interesting account of this pretty little bird :—'The nest of this species is another example of construction combining beauty of appearance with security and warmth. In shape it is nearly oval, with one small hole in the upper part of the side by which the bird enters. I have never seen more than one hole. The outside of this nest sparkles with silver-coloured lichens adhering to a firm texture of moss and wool, the inside profusely lined with soft feathers. The nest is generally placed in the middle of a thick bush, and so firmly fixed that it is mostly found necessary to cut out the portion of the bush containing it, if desirous of preserving the natural appearance and form of the nest. In this species the female is known to be the nest-maker, and to have been occupied for a fortnight to three weeks in completing her habitation. In this she deposits from ten to twelve eggs; but a larger number are occasionally found : they are small and white, with a few pale red specks, frequently quite plain, measuring seven lines in length, and five lines in breadth. The young family of the year keep company with the parent birds during their first autumn and winter, and generally crowd close together on the same branch at roosting-time, looking, when thus huddled up, like a shapeless lump of feathers only. These birds have several notes, on the sound of which they assemble and keep together; one of these call-notes is soft and scarcely audible; a second is a louder chirp or twitter, and a third is of a hoarser kind.'

2. The *Bearded Titmouse.* This is the *Mésange Barbue* ou *Moustache* of the French; *Bartmeise* of the Germans; *Least Butcher-Bird* of Edwards; *Reed Pheasant* (provincial) of the British.

Geographical Distribution.—The north of Europe, England, Sweden; Asia, on the shores of the Caspian Sea; nowhere so abundant as in Holland; accidentally, on passage, in France. (Temm.) In the third part of the second edition of his 'Manuel,' M. Temminck says, that in Italy it is as common in the marshes of Ostia, as in those of Holland near Amsterdam. As to Sweden, Pennant also states that it is rarely found there; but neither Müller, Brisson, nor Nilsson, notices it in that locality. Mr. Yarrell gives the best summary known to us of the recorded distribution of the species in the British Islands.

Habits, Food, &c.—Dr. Leach had observed the fondness of this species for marshy and reedy spots, the shape of its open cup-shaped nest placed on the ground, and the nature of its food—seeds, insects and their larvæ, and small-shelled snails. He had also remarked that the sides of the stomach

in this bird were muscular and much thickened, forming a gizzard which the true tits do not possess; and that this structure of the stomach afforded the power of breaking down the shells of the testaceous mollusks—*Succinea amphibia* and *Pupa muscorum*—many of which had been found comminuted therein. Still, from the comparative rarity of this bird in Britain, and the impervious nature of its haunts, its habits were comparatively little known. Mr. Hoy and Mr. Dykes have supplied much interesting information on this head.

3. The *Penduline Titmouse.* This is the *Rémiz* or *Mésange de Pologne* of the French, and *Beutel Meise* of the Germans.

Geographical Distribution.—Southern and eastern provinces of Europe principally; Russia, Poland, Hungary, Austria, along the banks of the Danube, where it breeds, south of France and Italy.

Habits, Food, &c.—M. Temminck has placed this species, together with the Bearded Tit, in his second Section of Titmice, the *Riverains;* and indeed the Penduline Titmouse, both in habits and in the choice of its food, has many points in common with the other species above described. Like the Bearded Tit, the Penduline Titmouse haunts the reedy banks of rivers, or the margins of 'wide-watered' shores, and its food consists not only of the seeds of the reeds, but of aquatic insects and mollusks. It derives its name from its pensile purse-like or flask-like nest, generally suspended at the end of some willow twig or other flexible branch of an aquatic tree. This skilfully-wrought cradle is woven from the cotton-like wool or down of the willow or poplar, with an opening in the side for the ingress and egress of the artificers and their young, and mostly overhangs the water; sometimes however it is interwoven among the reed-stems. The eggs, which are pure white marked with some red spots or blotches, are generally six in number.

Asiatic Titmice.

As an example of Asiatic Titmice we may select the *Parus xanthogenys* of Mr. Gould ('Century of Birds'), a native of the Himalaya Mountains, and the representative of our Greater Titmouse (*Parus major*), from which it differs principally in its crested head. Habits, that of the True Titmice generally.

American Titmice.

We may here notice, as a good example, the Black-Cap Titmouse of North America (*Parus atricapillus*). This bird is the representative of our Marsh Titmouse (*Parus palustris*), and by some ornithologists has been considered the same. On this point, see Swainson, Richardson, and the Prince of Canino ('Birds of Europe and North America'). Locality, Canada, the Fur Countries, Hudson's Bay, the United States, Mexico.

'In all these countries,' says Mr. Nuttall (the author of the 'Manual of the Ornithology of the United States and of Canada'), 'in autumn, families of them are seen chattering and roving through the woods, busily engaged in gleaning their multifarious food, along with the preceding species (*Parus bicolor*), Nuthatches, and Creepers, the whole forming a busy, active, and noisy group, whose manners, food, and habits bring them together in a common pursuit. Their diet varies with the season; for besides insects, their larvæ and eggs, of which they are more particularly fond, in the month of September they leave the woods and assemble familiarly in our orchards and gardens, and even enter the thronging cities in quest of that support which their native forests now deny them. Large seeds of many kinds, particularly those which are oily, as the sun-flower, and pine and spruce kernels, are now sought after. These seeds, in the usual manner of the genus, are seized in the claws, and held against the branch until picked open by the bill to obtain their contents. Fat of various kinds is also greedily eaten, and they regularly watch the retreat of the hog-killers, in the country, to glean up the fragments of meat which adhere to the places where the carcasses have been suspended. At times they feed upon the wax of the Candle-Berry Myrtle (*Myrica cerifera*); they likewise pick up crumbs near the houses, and search the weather-boards and even the window-sills familiarly for their lurking prey, and are particularly fond of spiders and the eggs of destructive moths, especially those of the canker-worm, which they greedily destroy in all its stages of existence. The European bird is supposed to be partial to marshy places. Ours has no such predilection, nor does the American bird, that I can learn, ever lay up or hide any store of seeds for provision—a habit reported of the foreign family.'

African Titmice.

Example.—White-Winged Titmouse (*Parus niger*, Vieillot; *Parus leucopterus*, Swainson).

This species is common in the Caffre country, South Africa. Mr. Swainson ('Birds of Western Africa') observes that Le Vaillant states that this species was never met with by him, either on the west coasts or near the Cape of Good Hope, but that this is very singular, since two specimens received from Senegal perfectly agree both with Le Vaillant's figure and description. Mr. Swainson remarks that the size of this bird is exactly that of *Parus major*, and that the structure is nearly the same, except that the bill is rather shorter and the culmen more arched; the feet also, he adds, are somewhat smaller, and their claws shorter, broader, and more curved.

Le Vaillant describes the note of this species, his *Mésange noire*, as the same with that of *Parus major*. The nest, he says, is made in the trunks of trees, where the bird also roosts. The pure white eggs, he adds, are from six to eight in number.

TITUS FLA'VIUS VESPASIA'NUS, the son of the Emperor Vespasianus, was born on the 29th of December, A.D. 40. He received his education together with young Britannicus, who was poisoned by Nero in A.D. 55. Titus distinguished himself at an early age. The first campaigns which he made as tribúnus militum were in Britannia and Germany. He first married Aricidia Tertulla, the daughter of a Roman knight, and after her death, Marcia Furnilla, who was of a noble family, but from whom he was divorced some time after she had borne him a daughter. The Jews, having been oppressed by Gessius Florus, revolted in A.D. 66, and defeated Cestius

Gallus, the proconsul of Syria, but they were beaten by M. Licinius Mucianus, the new proconsul of Syria, and T. Vespasianus, the father of Titus, who was commander of the Roman army, which consisted of three legions. One of these legions was commanded by Titus, who showed great military skill and courage, especially in the siege and capture of the towns of Taricheæ and Gámala (A.D. 67).

In the meantime the Emperor Nero was murdered, and Galba succeeded (A.D. 69). Vespasianus sent his son Titus to Rome to congratulate the new Emperor. When Titus reached Corinth, he heard of the murder of Galba (Jan., A.D. 69), of the accession of Otho, and of the imperial power being disputed between Otho and Vitellius. Upon this Titus prudently returned to his father in Judæa.

Titus reconciled his father and Mucianus, the proconsul of Syria, who had not been on good terms, and Vespasianus was proclaimed emperor by the army in the East, while Vespasianus's brother, Flavius Sabinus, occupied for him the capitol in Rome, and Vitellius was deposed and put to death. When Vespasianus left Judæa for Rome, the command of the army and the continuation of the war against the Jews were given to Titus.

The Roman commander prosecuted the war with vigour, and after a long siege Jerusalem was taken with great slaughter on Sept. 2, A.D. 70. In this year Titus was created Cæsar by his father, and was his colleague in his first consulship. Being summoned home by Vespasianus, Titus celebrated with his father a triumph for their Jewish victories, which was also commemorated by the erection of a triumphal arch, one of the existing monuments of ancient Rome.

During the reign of Vespasianus, various high functions were conferred upon Titus, whose character however seems to have been somewhat altered by the influence of the general corruption of the capital. Men began to fear that he would not be able to resist the temptations of power. But no sooner did Titus become Emperor by the death of Vespasianus, in A.D. 79, than he showed that all these fears were unfounded. His virtuous conduct was the subject of general admiration. During his short reign the empire was visited by great calamities. An eruption of Vesuvius destroyed the towns of Herculanum, Stabiæ, and Pompeii, and carried ruin over the fertile coast of Campania (August, A.D. 79). In A.D. 80 a conflagration broke out in Rome, which destroyed a great part of the city. A plague next broke out, of which 10,000 persons died every day. Titus supported his unhappy subjects with the greatest liberality, and exhausted his treasures in giving them relief. He acted with great generosity towards his brother Domitian, who was charged with conspiring against the Emperor's life. Titus amused the Romans with the splendid spectacles which he exhibited in the Colosseum, or the Flavian Amphitheatre, which was commenced under Vespasianus and finished by Titus. During the reign of Titus the Roman commander Agricola tranquillised Britain and penetrated into Scotland.

In A.D. 81 Titus being ill in health retired to a family villa at Reáte, among the Sabine mountains, where his father died. In September of this same year Titus also died at Reate, leaving behind him a memory which the people cherished, and his brother Domitian as his unworthy successor.

TITUS, *Epistle of St. Paul to.* Little is known of the personal history of Titus, to whom this Epistle is addressed. His name is not even mentioned in the 'Acts of the Apostles,' and all authentic information about him is derived from the Epistles of St. Paul. From these it appears that Titus was converted by St. Paul, by whom he is called 'his own son after the common faith' (i. 4), but when and where is not recorded. This we know for certain, that Titus was (Acts, xv.; Gal., ii.) with St. Paul in Antioch before the first Council was holden at Jerusalem, and that he was one of the party sent by the church at Antioch to consult the Apostles at Jerusalem, on the question whether it was necessary for the Gentile converts to submit to circumcision. To this rite the Judaising Christians at Jerusalem were anxious that Titus should submit; but St. Paul (Gal., ii.) informs us that he firmly refused to do so. After the Council, it would seem that Titus returned with St. Paul to Antioch, and subsequently accompanied him on some of his travels.

We have no certain information as to the time and place of Titus's death. The date of the Epistle has been a subject of much controversy, some placing it as early as A.D. 52, and others as late as A.D. 65. St. Paul's design in writing it was to instruct Titus in the discharge of the duties of his ministry. Its authenticity has never been disputed.

For coincidences between this Epistle and the 'Acts of the Apostles,' see Paley, 'Horæ Paulinæ.'

TIT-WARBLERS, Mr Swainson's name for a subgenus of his subfamily *Parianæ* (TITMICE), peculiar to America, and closely resembling the Worm-Eaters (*Vermivora*, Swainson). These birds are active and lively, continually hunting after sedentary insects, and pursuing such as fly from bough to bough; being in habits not unlike our Fly-Catcher (*Muscicapa*). Example, *Sylvicola minuta*, Swainson. Locality, Brazil.

TIVANDRUM. [HINDUSTAN, vii. 192.]

TIVERTON. [DEVONSHIRE.]

TI'VOLI, the ancient *Tibur*, a town in the Papal State, 16 miles E.N.E. from Rome, situated on the slope of a hill on the left bank of the Anio, or Teverone, just above the spot where that river falls by a succession of beautiful falls into the lowlands of the Campagna. Tibur existed as a town before the building of Rome, and was in the early history of the great city one of the principal towns of the Latin Confederation. The healthy and romantic situation of the neighbourhood of Tibur induced the wealthy Romans to construct in it handsome country residences. The mausoleum of the Plautii, in shape a massive round tower, is still seen at Ponte Lucano, a few miles from the town on the road to Rome. Augustus used to visit Mæcenas at his villa at Tibur, and Horace had a country-house in the neighbourhood. The Emperor Hadrian constructed near

Tibur a magnificent villa, of which extensive remains are still seen. Under Aurelian, the famous Zenobia, queen of Palmyra, after having followed the triumphal procession of her conqueror, was by order of the senate banished to Tibur, where she is said to have lived many years.

Tivoli is the head of a district of the comarca of Rome, which contains 55,825 inhabitants, and includes most of the old territory of Tibur. It is one of the few ancient towns of Latium which stands on its original site. The temple of Vesta, vulgarly called 'Della Sibilla,' with its Corinthian pillars, still occupies its commanding position; the temple of Hercules has been formed into a cathedral; the Roman road, or Via Tiburtina, crosses the town; the Roman bridge called Ponte Celio, or Ponticelli, is still extant. There are considerable remains of the Villa of Mæcenas near the Cascatelle, or smaller falls. Remains of that of Quintilius Varus are shown near a church called Quintiliolo. Another round temple, vulgarly styled 'Della Tosse,' or of the goddess Tussis, is outside of the Roman gate. The castle built by Pope Pius II. still remains. Tivoli is a bishop's see; it has a college, and a town library of about 6000 volumes; several manufactories of iron, leather, and paper; and 5300 inhabitants. The surrounding hills are covered with olive-trees. The streets of the town are narrow and steep. Near Tivoli is the extensive villa and ornamental park constructed about the middle of the 16th century by the Cardinal Ippolito d'Este. The mansion is adorned with frescoes by Zuccari and Muziano. The view from the terrace before the house is magnificent. The country about Tivoli and the valley of the Anio above it is one of the most pleasant, salubrious, and romantic districts near Rome. The vines of Tivoli are famed for a peculiar sort of grape, called 'pizzutello' and 'pergolese,' which is much in request for the table. The stone commonly called 'travertino,' of which many of the buildings of Rome are built, is quarried near Tivoli.

(Viola, *Storia di Tivoli della sua origine fino al Secolo XVII.*, Roma, 1819; Westphal, *Die Römische Kampagne*, Berlin, 1829.)

TLEMSIN. [Algiers.]

TOAD [Frogs], a family of Caducibranchiate Amphibia (*Anoures phanéroglosses*, Dum. et Bibr.), almost universally distributed, and consisting of several genera, as *Dendrobates, Rhinoderma, Atelopus, Bufo, Phryniscus, Brachycephalus, Hylædactylus, Plectropus, Engystoma, Uperodon, Breviceps*, and *Rhinophrynus*.

Of about thirty-one accredited species, two only are found in Europe, viz. the common Toad (*Bufo vulgaris*), and the Natter Jack (*Bufo Calamita* or *viridis*, Laur.); both indigenous in our island. These two also inhabit Asia, and the northern portions of Africa. America possesses the greatest number of species.

TOBACCO, the common name of the plants belonging to the monopetalous genus *Nicotiana*. Tobacco was the name used by the Caribbees for the pipe with which they smoked, but was transferred by the Spaniards to the herb itself. The genus *Nicotiana* contains about 40 species, most of them yielding tobacco for smoking, and many of them cultivated in the gardens of Europe.

N. Tabacum, Common Virginian or Sweet-Scented Tobacco, is a native of the West Indies, where it first became known to the Spaniards, and of Virginia, where the English first became acquainted with its properties. Of the various species it is that which is most commonly cultivated in gardens as an ornament. It is also largely cultivated in Europe for the purpose of smoking. *N. macrophylla*, Orinoco Tobacco, is a larger plant than the last, the stem rising from five to seven feet high. It is a native of America, and is frequently used for smoking, under the name Orinoco Tobacco. *N. rustica*, English Tobacco, is a native of Europe, Asia, Africa, and America. It is called English Tobacco because it was the first species that was introduced into this country for growth; it was then brought from America. It grows very well in this climate. In the shops this tobacco is known as Turkish Tobacco. *N. Persica*, Shiraz Tobacco, is a native of Persia, and furnishes the Shiraz Tobacco. This tobacco is milder than that produced by the *N. tabacum*, and very little is consumed in this country.

Cultivation. — The cultivation of tobacco is most extensively carried on in the United States of North America. It requires considerable heat to bring it to perfection; but with care and attention, and by treating it as an exotic, it may be very successfully cultivated in much colder climates.

In Holland, of which the climate differs little from that of Great Britain, the tobacco-plant is cultivated to a very great extent, even in very poor soils, by great attention to manuring, and by accelerating the growth of the plant. The seed is sown in a well-prepared seed-bed in March, and protected by mats laid over hoops as long as the nights are cold, and frost is dreaded. The ground in which the tobacco is to be transplanted is laid in narrow beds with intervals between them, which are dug out deep as is done with asparagus-beds. These beds are two feet wide at top, and two feet six inches at bottom, with intervals of six or eight inches, which serve not only as drains to keep the beds dry, but as paths from which the surface of the beds may be stirred and weeded. The plants are taken up carefully with a trowel; they are placed slanting in a shallow basket, and are thus carried to the prepared beds; they should have a stem six or eight inches long. They are inserted into holes made by a proper instrument, so that the fibres of the roots and the adhering earth may be completely buried up to the bottom of the stem: four or six leaves should be on the plant; if more the lowest may be pinched off. Weeds must be carefully eradicated, and the earth repeatedly stirred between the plants with hoes and narrow spades to accelerate the growth. When the leaves acquire a certain size the lower leaves should be pinched off, to increase the bulk of the upper: for the former are apt to wither before the latter have acquired their full growth. A fine tobacco plant should have from eight to twelve large succulent leaves, and a stem from three to six feet high; the top should then be

pinched off to prevent its running and drawing the sap from the leaves. A few plants are left for seed, and of these the heads are allowed to shoot the full length. Tobacco takes about four months from the time of planting to come to perfection; that is, from May to September, when the leaves are gathered before there is any danger from frost: one single white frost would spoil the whole crop, and cause it to rot. As soon as the colour of the leaves becomes of a paler green inclined to yellow, they are fit to be gathered. The leaves are most advantageously gathered when the sun shines. The plants are cut down close to the ground, and are left on the ground to dry till the evening, taking care to turn them often, that they may dry equally and more rapidly. They are housed before the evening dew falls, which would injure them, and are laid up under cover in heaps to sweat during the night; and some mats are thrown over the heaps to keep in the heat. If they are very full of juice, they are sometimes carried out again the next day to dry in the sun; but most commonly they are left to sweat for three or four days, and then moved and hung up to dry in sheds or buildings made for the purpose, which allow a thorough draught of air, but keep out the rain. When the plants are quite dry, they are removed in moist or foggy weather: for if the air is very dry, the leaves would crumble. They are laid in heaps on hurdles and covered over, that they may sweat again, and are examined from time to time to see that they do not heat too much; and, according to the season and whether the plants are more or less filled with sap, they remain so a week or a fortnight. If the leaves were not stripped off at first, which is not the most common practice, they are taken off now and sorted; those which grow on the top of the stem, in the middle, and at the bottom, are laid separately, as being of different qualities. They are tied together in bundles of ten or twelve leaves, and again dried carefully, when they are ranged in casks horizontally, and pressed in, by means of a lever or screw.

Manufacture.—Tobacco is packed in hogsheads for shipment: it is done with the greatest care; and the pressure applied is so great, that a hogshead 48 inches in length, and 30 or 32 inches in diameter, will contain one thousand pounds weight. Upon the arrival of the tobacco in this country it is conveyed to bonding-warehouses, examined, charged with duty, and sold to the manufacturers.

The manufacture of the tobacco-leaves into the numerous varieties of tobacco for smoking in pipes is commenced by loosening and opening the bundles, and sprinkling the leaves with water. The stalks are then stripped from the leaves; this is effected by women or boys, who fold the leaf along the middle, and, by means of a small instrument, separate the stalks from the leaves, and lay them aside in different heaps. To prepare them for being cut into shreds, the leaves are pressed together in large numbers. When removed from the press to the cutting-engine, the cake of leaves is as hard as a board; yet it retains a slight degree of clamminess or moisture from the leaves having been previously sprinkled. In cutting the tobacco, the cake of leaves is laid upon an iron bed, which is susceptible of a slow progressive motion by means of a screw which passes beneath it, and is connected with a cog-wheel in such a manner that, while the machine is moving, the bed is constantly urged forward. Another part of the mechanism gives motion to the knife, which has a sharp blade, rather longer than the width of the cake, and is pivoted on a hinge or fulcrum at one end, the other rising and falling with the action of the machinery.

The kind called pig-tail tobacco is produced by a process similar to spinning, and requires the simultaneous aid of a man and two boys. A bench several yards in length is made use of, with a spinning-wheel at one end, turned by one of the boys. The other boy arranges a number of damp leaves, with the stalks removed, end to end upon the bench, taking care to lay them smooth and open; and the man immediately follows him, and rolls up the leaves into the form of a cord by a peculiar motion of his hand. As fast as this is done, the finished tail is wound upon the spinning-wheel. It is transferred from the spinning-wheel, by the action of the machinery, to a frame connected with it; and subsequently it is wound or twisted up into a hard close ball.

The manufacture of cigars is exceedingly simple. A boy, with a quantity of unstripped leaves before him, takes them one by one, strips them, and then passes them to the cigar-maker, who is seated in front of a low work-bench, which has raised ledges on every side excepting that nearest to him. He takes a leaf of tobacco, spreads it smoothly before him on the bench, and cuts it to a form resembling one of the gores or stripes of a balloon. He then lays a few fragments of tobacco-leaf in its centre, and rolls the whole up into a form nearly resembling that of a cigar. The next operation is to place the partially-formed cigar in an iron gauge, which cuts it to a given length. The maker then lays a narrow strip of leaf upon the bench, and rolls the cigar spirally in it. All this is done with great rapidity, a few seconds being sufficient for the production of a cigar. The cigars are finally dried for sale.

Snuff, which requires a higher degree of care in its manufacture than any other product of the tobacco-plant, is made either from stalks only, from leaves only, or from a mixture of the two. That known as Scotch snuff is made either wholly of stalks, or with a very small admixture of leaves. High-dried snuffs owe their peculiar qualities chiefly to a degree of drying which imparts a scorched flavour to them; and innumerable varieties are produced by the choice, mixture, and preparation of different tobaccos. Little is done at the snuff-mills beyond a preparatory drying of the tobacco and the actual grinding; but the snuff usually receives some finishing operations after it leaves the mill.

Tobacco is not allowed to be grown, for use or manufacture, in England. It is grown to some extent in most of the southern and central countries of Europe. The finest-flavoured tobacco is grown in Cuba and Manilla.

Trade.—For the following years the consumption of tobacco and the population were—

	Population.	Consumption.	Duty per lb.
1801	10,942,646	16,514,998 lbs.	1*s.* 7*d.*
1811	12,609,864	14,923,243	2*s.* 2*d.*
1821	14,391,631	12,983,198	4*s.*
1831	16,539,318	15,350,018	3*s.*
1841	18,535,786	16,000,000	3*s.*

Seven-eighths of all the tobacco brought into this country is grown in the United States. The duties payable are 3*s.* 1⅘*d.* per lb. on unmanufactured tobacco; 9*s.* 5⅖*d.* per lb. on cigars and manufactured tobacco; and 6*s.* 3⅗*d.* per lb. on snuff.

The following is an account of the weight of Leaf Tobacco, Manufactured Tobacco, and Cigars, entered for Home Consumption in the years ending Jan. 5, 1849, and Jan. 5, 1850, with the Duty thereon :—

	1848. lbs.	1849. lbs.
Tobacco unmanufactured .	27,098,314	27,480,666
,, made into Cigars .	206,581	204,811
,, made into Snuff .	239	280
Total	27,305,134	27,685,757
Total Duty .	4,365,233*l.* 12*s.*	4,425,040*l.* 6*s.*

There is both smuggling and extensive adulteration of tobacco; an act was passed (5 & 6 Victoria, c. 93) intended to remedy one of the sources of loss to the revenue, by again subjecting the manufacturers and dealers to the supervision of the excise. Up to 1825 both a customs and excise duty was collected on tobacco; but since that year the duty has been wholly collected by the officers of the customs at the ports of importation. A strict survey of the manufacturers' premises, and a registry of their operations and the sales of the retail dealers, were still kept up by the excise, though they no longer collected any duty. This survey was at length abolished in 1840 by the 3 & 4 Vict., c. 18 : it is now partially re-established.

For the chemical and medicinal properties of Tobacco, see NICOTIANA TABACUM.

TOBACCO-PIPES are made of clay, white and coloured earths, porcelain, ivory, and various other substances. The tobacco-pipes commonly used in this country are formed of a fine plastic white clay, which is called, from this application, pipe-clay. It is procured chiefly from Purbeck in Dorsetshire, and, after being purified and made into a soft state, is cut into small pieces, each enough for one pipe. Each piece is kneaded thoroughly upon a board, and rolled out to nearly the form and size of a pipe, with a projecting bulb at one end for the formation of the bowl. These pieces are laid aside for some time to dry, and when the clay is sufficiently firm, they are subjected to the curious process of boring. The workman takes the roll of clay in his left hand, and with his right inserts the end of an iron needle, previously oiled, in the small end of the roll, and by dexterous management thrusts the needle through the whole length of the roll, without penetrating the surface. The bulb is then bent into the proper position to form the bowl, and the piece of clay, with the needle remaining in it, is pressed into a mould to complete its form. The moulds are made of metal, in two halves. The bowl is partially hollowed by the finger, and completed by the insertion of an oiled stopper or mould. The wires are now withdrawn, and the pipes are taken out of the moulds, slightly smoothed over, and laid aside to dry. After drying for a day or two, any remaining roughness is removed by means of an instrument of bone or hard wood, and then the pipes are sometimes moulded a second time, and polished with a piece of flint bored with holes, through which the stem is passed repeatedly. The pipe-stems are thus far straight, but before going to the kiln they are slightly bent.

The tobacco-pipe-kiln consists of a large but very light cylindrical crucible, with a dome-shaped top, and a circular opening in one side for the insertion of the pipes. This crucible is mounted in a brick furnace, lined with fire-brick, in such a manner as to leave a space of about four inches all round for the circulation of flame. The pipes are placed in the kiln with their bowls against the circumference, and their ends supported at a considerable elevation upon circular pieces of clay set up in the centre. By this arrangement one furnace may contain fifty gross, or 7200 pipes, which may all be baked within eight or nine hours.

TOBAGO, an island in the Columbian Archipelago, in 11° 16′ N. lat. and 60° 30′ W. long. It is the most southern of the Caribbee Islands, and lies about 25 miles N. from Trinidad. Its greatest length is 32 miles, and greatest breadth about 13 miles. A mountainous ridge 1800 feet high extends two-thirds of the length of the island, and smaller ones proceed from it, rendering the general surface of the interior irregular and abrupt. The valleys and ravines are well watered, and there are alluvial plains of small extent. The northern coast is lofty and rugged, and the southern terminates in lowlands. Tobago is out of the range of hurricanes. There are harbours on both the northern and southern coasts for vessels of 150 tons. The capital and chief port is Scarborough, on the northern coast.

Tobago was discovered by Columbus in 1496, and derives its name from the pipe used by the native in smoking the leaves of the tobacco-plant. At an early period the British flag was planted on the island, and James I. granted it to the Earl of Pembroke, but no attempt was made by the English to colonise it. In 1632 the Dutch formed a settlement. The island was afterwards in the possession of the Spaniards, British, and French. In 1793 the British again obtained possession of it, and by them it has been held ever since.

When the West India slaves were emancipated in 1834, the slaves of Tobago numbered 11,589 ; for whose emancipation the sum of 233,875*l.* was paid. The white inhabitants at that time amounted to less than 300. The population in the year 1848 was about 15,000, of whom only 220 were Europeans.

Scarborough, the chief town, has lately been incorporated. It has a government house, which cost 9000*l.*, a court house, a town gaol, and other public buildings. A water reservoir has recently

been formed for the convenience of the inhabitants. A lighthouse was built in 1842, about a mile from the town.

In 1848 there were 10 places of worship, with schools attached, to which government grants were made: namely, 6 of the established church, 4 Wesleyan, and 2 Moravian. The island is divided into 7 parishes. In 1849 there were 7 sugar plantations in the island, the produce of which was about 4000 hogsheads. The imports of the island in 1848 amounted to 51,089*l.*; the revenue to 3218*l.*; and the expenditure to 7623*l.* From a recent report of the governor, it appears that in this small and poor colony there are two Legislative Chambers, a Court of Chancery, a Court of Error, a Court of Ordinary, a Vice-Admiralty Court, a Court of Queen's Bench, a Court of Common Pleas, a Court Merchant, an Insolvent Debtor's Court, and a Court of Complaints.

TOBIN, JOHN, was born at Salisbury in 1770. After having been educated at the grammar-school of Southampton, and at Bristol, by the Rev. Mr. Lee, he was in 1785 placed in the house of a London solicitor, in which house he eventually became a partner. His ambition was however early directed to dramatic composition, and for fifteen years he persevered in offering to the theatres play after play, each of which was uniformly rejected by the managers. At length he produced 'The Honeymoon.' This play was refused at Covent Garden, but finally accepted at Drury Lane. In the meantime its author was obliged to leave London from ill health, and he died Dec. 8, 1804. 'The Honeymoon' was produced at Drury Lane, Jan. 31, 1805, and was attended with an amount of success such as falls to the lot of few dramatic compositions. Some of Tobin's rejected pieces were afterwards brought upon the stage with a slight degree of success; but they are now forgotten, with the exception of 'The Honeymoon,' which is still occasionally played. Memoirs of John Tobin, with several of his unacted dramas, were published by Miss Benger, in 1820.

TOBIT (according to the Vulgate, *Tobias*), a canonical book of the Old Testament according to the Roman Catholics, but the divine authority of which is rejected by the Protestants.

The Book of Tobit, which consists of his history, purporting to be written by himself, may be regarded as a tale written to inculcate the duty of trust in God, and to show how such confidence will be recompensed eventually. The translation in the Vulgate was made by St. Jerome from the Chaldee. It also exists in Greek, which is probably a translation of an old Hebrew original, of which the Chaldee text used by St. Jerome was perhaps also a translation. There is a Syriac version besides, which differs considerably from the Greek and Latin ones. It seems impossible to determine with any accuracy the time when the book was written.

TOBOLSK, a government of Asiatic Russia, is bounded N. by the Frozen Ocean, W. by the governments of Archangel, Orenburg, and Perm, and S. and E. by Tomsk and Jenisseisk: the area is above 519,200 square miles, and the number of inhabitants about 822,684. On the west it is separated from European Russia by the chain of the Ural Mountains. The principal rivers are the Obi, the Tobol, the Irtisch, and the Tura. In the south and south-western parts the summer is warm and pleasant; the winter is very cold, and much snow falls. Here also the soil is very fertile, and produces abundance of corn and flax. The really agricultural districts are on the west, on the Tobol and its tributaries, which yield luxuriant crops, and supply with grain not only the tracts to the north, but the governments of Perm and Orenburg. There are also rich pastures favourable for the breeding of horned cattle, horses, and sheep. Here and there some camels are bred. This part of Siberia is equally remarkable for the prodigious quantity and value of the fish in the great rivers. Partridges, grouse, black-cock, and other game are very abundant. The Ural Mountains produce iron, copper, gold, and platina. From the shores of the Frozen Ocean to 60° N. lat. the whole country is covered with thick forests, the ground of which is a morass; these gradually give way to a few pines and stunted shrubs, and these too entirely disappear towards the Frozen Ocean, where a little moss is almost the only sign of vegetation. The fishery and the chase of the fur-bearing animals are the only resources of this inhospitable tract. This government is formed out of part of western Siberia. [SIBERIA.]

Tobolsk, the capital of the government, is situated in 58° 12′ N. lat., 68° 5′ E. long., at the junction of the Tobol with the Irtisch. It is divided into the upper and the lower town: the former, on the east bank of the Irtisch, is on a hill, which runs parallel to the river, at a small distance from it; the latter, which is the larger, fills the space between the hill and the river, and is exposed to inundations. The communication between the upper and lower town is by a gently-rising causeway laid with planks. Tobolsk is the see of a Russian archbishop, the metropolitan of all Siberia, and has a theological seminary, a training school, some printing-offices, and a theatre. The only manufactures of importance are of Russia leather; the Russian and Tartar women make linen, carpets, and woollen cloth. There are in all 23 churches, two mosques, and two convents. The population, consisting of Russians, Germans, and Tartars, amounts to 20,000, exclusive of the soldiers, the clergy, and the exiles, for which last class there is a house of correction. Tobolsk has a very considerable transit-trade between European Russia and China, Bokhara, and Tartary. There are extensive magazines for the various descriptions of goods.

TOD, JAMES, Lieutenant-Colonel in the service of the East India Company, was born in 1782, in England, but educated in Scotland. He went out to India in 1800, and obtained a commission in the 2nd Bengal European regiment; thence he volunteered for the Moluccas, and, in 1805, when in the subsidiary force at Gwalior, in Hindustan, was attached to the embassy sent at the close of the Mahratta war to the camp of

Sindia in Mewar, where the embassy arrived in the spring of 1806. In 1817 he was appointed political agent, with the entire control of five of the states which had placed themselves under British protection—Mewar, Marwar, Jessulmeer, Kotah, and Boondee. The results of his investigations into the geography, history, and antiquities of Rajpootana are given in his 'Annals of Rajast'han.'

In 1822 the impaired state of his health rendered it necessary that he should return to his native country. Previously however, he made a circuit of nearly the whole of Rajpootana, including Gujerat, and in the beginning of 1823 he sailed from Bombay, and arrived safely in England. After his return, his time was chiefly devoted to literary pursuits. He officiated for a while as librarian to the Royal Asiatic Society. In 1834 he went to the Continent for the relief of a complaint in the chest, and remained abroad twelve months. He returned to England Sept., 1835. While at Rome he was occupied with his 'Travels in Western India,' which have not yet been published. He died in London, Nov. 17, 1835, at the age of fifty-three.

Bishop Heber, who travelled through Mewar and the adjoining Rajpoot states in 1825, bears testimony to the affection and respect borne to Colonel Tod in various towns through which the bishop passed. Bheelwara, a commercial town, which had been ruined by the Mahrattas at the time when Colonel Tod was appointed political agent, owed its re-existence entirely to him. Colonel Tod says, 'In February, 1818, there was not a dog in it; in 1822 I left 3000 houses, of which 1200 were bankers and merchants.'

The 'Annals of Rajast'han' were published in London, in 2 vols. royal 4to., in 1829 and 1832.

TODD, REV. HENRY JOHN, was born in 1763, and educated at Hertford College, Oxford, where he proceeded M.A. in 1786.

He became a minor canon of Canterbury Cathedral soon after being ordained. In 1792 he was presented to the vicarage of Milton, near Canterbury; and some years after to the rectory of Allhallows, Lombard Street, London. In Nov. 1803, he was appointed Keeper of the Manuscripts at Lambeth. In 1820 he was withdrawn from London, by being presented to the rectory of Settrington, in Yorkshire; in 1830 he was collated by the archbishop of York to the prebend of Husthwaite, in that cathedral; and, finally, in 1832 he was appointed archdeacon of Cleveland.

His first publication was 'Some Account of the Deans of Canterbury, from the new foundation of the Church by Henry VIII.,' 8vo., 1793. This was followed by an edition of Milton's 'Masque of Comus,' with Notes and Illustrations, from a manuscript belonging to the Duke of Bridgewater, 1798; 'The Poetical Works of John Milton,' with Notes and a Life, 6 vols. 8vo., 1801; 'The Works of Edmund Spenser,' with Notes and a Life, 8 vols. 8vo., 1805, reprinted in 1845; 'Illustrations of the Lives and Writings of John Gower and Geoffery Chaucer,' 8vo., 1810; besides a variety of works, controversial pieces, &c.; and an edition of Dr. Johnson's 'Dictionary of the English Language, with corrections and additions, 4 vols. 4to., 1814. These corrections and additions are not characterised either by sound and extensive general knowledge or critical exactness. Archdeacon Todd, who was a chaplain in ordinary to Her Majesty, died at Settrington, Dec. 24, 1845.

TODDA'LIA, a genus of plants of the natural family of *Rutaceæ*, tribe *Xanthoxyleæ*, which is itself sometimes made into a distinct order. The name *Toddalia* is derived from Toddali, the Malabar name of one of the species.

TODDINGTON. [BEDFORDSHIRE.]

TODMORDEN. [LANCASHIRE.]

TOFA'NA. [AQUA TOFANA.]

TOFIELDIA, a genus of plants belonging to the natural order *Colchicaceæ*. *T. palustris* is the only British species.

TOGA is the name given to the principal outer garment worn by the Romans. The toga was the peculiar garment of the Romans, which in times of peace they wore both at home and abroad. Hence they are called Gens Togáta (Virgil, 'Æn.,' i., 282) and Togati (Sallust, 'Jugurth.,' 21), in contradistinction from other nations. The right of wearing it was the exclusive privilege of Roman citizens of every age and sex. Slaves, foreigners, and Romans sent into exile, were not allowed to wear it. As the toga covered the whole body with the exception of the left arm, it could not be worn by a person while at work either at home or in the field.

The material of which the toga was made was woollen cloth, which differed in thickness and fineness according to circumstances and the seasons. Under the empire persons of rank used to have their togas made of silk. The colour was usually white, probably the natural colour of the wool.

Besides the different kinds of togas we have mentioned above, the following must be noticed:—

1. *Toga prætexta* was worn by the children of the nobles, by girls until they married, and by boys until they attained the age of puberty (fourteen), when they exchanged it for the *Toga virilis*, also called pura, libera, or recta, which was the usual white toga described above. The prætexta was also the official robe of the higher magistrates of the city and the municipia, as well as of the colonies. The name prætexta was derived from the circumstance of this toga being adorned with a broad purple border (latus clavus).

2. *Toga picta* was a toga ornamented with embroidery and gold according to the Etruscan fashion. It was worn by generals in their triumph.

TOKAT, or TOCAT, a large open town of Asia Minor, situated in about 40° 16′ N. lat., 36° 45′ E. long., has a population estimated at 40,000 by some, by others at 80,000. Tokat is surrounded by hills on three sides, the only opening being to the north-east; a small stream runs through the town, and joins the Tokat-Su (ancient Iris) a little below the city. The houses are all tiled (*i.e.* not flat-roofed), and the higher class of them built with unburnt bricks, but the greater part are merely wooden sheds. The streets are filthy, narrow, and gloomy. Still some of the edifices are of good size, and parts of

the town are tolerably neat for a Turkish city. Fires are frequent in Tokat. The luxuriant vegetation of the gardens in and near the town, the filthiness of the streets, and the abundance of fruit, occasion malignant fevers in summer and autumn. Tokat is under the Bey of Sivas. It is the seat of an Armenian bishop. There is an extensive dyeing establishment in which British calicoes and indigo are used; there are also an establishment for printing cotton; an extensive copper refinery, to which copper from the mines of Arghana is brought to be refined, amounting to about 1000 tons a year; and there are also silk factories. Madder and yellow-berries are extensively grown in the neighbourhood of Tokat.

TOKAY. [Hungary.]

TOLAND, JOHN, was born Nov. 30, 1669 or 1670, at Inis-Eogan, in the county of Londonderry, Ireland. His parents were Roman Catholics; but he himself, as he tells us, in answer to a charge made against him that he was a Jesuit, 'was not sixteeen years old, when he became as zealous against Popery as he has ever since continued.' He went in 1687 to the university of Glasgow, and after being there three years, to the university of Edinburgh, where he got a diploma as M.A., in June, 1690. Shortly after this he went into England, where managing to gain the favour of some influential dissenters, he was sent by them to the university of Leyden to prepare himself for the duties of a minister.

He stayed at Leyden about two years. On his return to England he went for some time to Oxford, where he began his 'Christianity not Mysterious,' which was published in London in 1696, the year after his leaving Oxford. The work created a very considerable sensation, and elicited much attack and some persecution.

In 1697 Toland returned to his native country; but pecuniary difficulties and persecutions obliged him to leave Ireland in a very short time. He then went to London, and published 'An Apology for Mr. Toland, in a Letter from himself to a Member of the House of Commons in Ireland.' He now devoted himself very vigorously to bookmaking of all sorts, in politics, theology, and literature; among which was 'Anglia Libera, or the Limitation and Succession of the Crown of England explained and asserted.' This pamphlet was published in 1701, on the passing of the act which settled the crown on the Princess Sophia of Hanover and her heirs, after the death of William, and of Anne without issue; and Toland went over to Hanover and presented it to the electress with his own hands. He won the good opinion of the Princess Sophia, and shortly afterwards, when he went to Berlin, of the Queen of Prussia.

In 1702, in an interval of his residence abroad, he published 'Vindicus Liberius, or Mr. Toland's Defence of himself against the Lower House of Convocation and others.' In this work his opinions assumed a very orthodox tone; but he soon threw off the mask in a pamphlet which he published in 1705, in the title of which he did not scruple to designate himself a Pantheist. He was now enjoying the patronage of Harley, afterwards earl of Oxford, who had in the previous year become secretary of state. Harley employed him to write several political pamphlets, and sent him abroad again in 1707, to Germany and Holland. Toland continued abroad for about three years, and after his return, in due time he quarrelled with Harley, and then wrote pamphlets against him. The works which he afterwards published were very numerous.

Towards the close of his life, Toland, whom all his literary industry could not keep from pecuniary difficulties, found a benefactor in Lord Molesworth. Toland died at Putney, March 11, 1722. His posthumous works were published in 1726, in 2 vols. 8vo.

TOLEDO, Province. [Castilla-la-Nueva.]

TOLE'DO (*Toletum*), the capital of the province of Toledo in Spain, is situated on a rocky eminence surrounded, except on the northern side, by the Tagus, in 39° 52′ N. lat., 4° 11′ W. long., and has about 15,000 inhabitants. Toledo was a city of some importance under the Romans. In A.D. 577 Leovigild, king of the Goths, transferred the seat of his empire from Seville to Toledo. It was also greatly enlarged and embellished by Wamba, who surrounded it with walls. The city was taken by the Moors under Tárik Ibn Zeyyád, in April, 712. Under the Moors Toledo was second only to Cordova, the capital of the Mohammedan Empire. Alfonso VI. of Castile and Leon took Toledo from the Moors on the 25th of May, A.D. 1085. Alfonso having assumed on the occasion the title of Emperor of Toledo, the city was thenceforward styled Royal and Imperial. During the civil wars between Peter the Cruel and his bastard brothers Don Fadrique and Don Enrique (1354–69), Toledo was often taken and retaken, and the population, which consisted chiefly of Jews, submitted to all kinds of ill-treatment.

Toledo is the see of an archbishop, who is the primate of all Spain, and has the title of 'Canciller de Castilla.' The cathedral is the largest in Spain, and is by some considered the finest. It stands on the site of the old Moorish mosque, and the foundations were laid, in 1258, by St. Ferdinand and Rodrigo Ximenez, archbishop of Toledo. It consists of five naves, and measures 404 feet in length, and 204 in width; the central nave is 160 feet high, and the whole interior is lighted through painted glass windows of matchless beauty. The naves are supported by 84 colossal pillars, and the whole church is paved with white and blue marble. The choir, which occupies the central part of the great nave, and some of the chapels which are exceedingly beautiful, contain many monuments of the kings and nobles of Spain, and are deserving of notice for the profusion of exquisite carvings in wood, marble statuary, and decorations with which they abound. Annexed to the cathedral is the archbishop's palace, which contains a very fine library, rich in old manuscripts. The convent and church of San Juan de los Reyes is a fine building erected in 1476, by Ferdinand and Isabella, in commemoration of the victory gained over the Portuguese at Toro. At a later period the manacles and fetters worn by the Christian captives of Granada, liberated at the taking of that city in 1492, were suspended to the outside walls of

the building, where they are to be seen to this day. The foundling hospital of Santa Cruz, founded by Cardinal Mendoza in 1304; the hospital of St. John the Baptist, outside the city walls, built and richly endowed by Cardinal Tavera; San Juan de la Penitencia, which is a foundation of Ximenez,—all will afford subject of study to the artist. The Church del Transito, formerly a Jewish synagogue, is a curious specimen of Saracenic architecture. The same may be said of another church, called Santa Maria la Blanca, which was once a Moorish mosque.

The Alcazar, or royal palace, stands on an eminence above the Tagus, and is now only a splendid ruin. It was built by Alfonso X. on the site of the Moorish palace, and was almost entirely rebuilt by Charles V., who employed the best Spanish architects of his time. His son, Philip II., made also considerable additions to it, which were principally directed by his chief architect, Herrera, who designed the Escurial. A lunatic asylum, called 'el Nuncio nuevo,' and the 'Universidad Literari,' are the only two modern buildings of note; both were erected by archbishop Lorenzana, about the end of the last century. Of the two bridges on the Tagus, that of Alcantara, which is fortified, was built by the Moors. It consists of only one arch. The streets of Toledo are very narrow and crooked. The houses which are built in the Moorish style, have generally only one or two stories; and the apartments are arranged round a court, over which an awning is thrown. The environs of the city are barren and unproductive, but the neighbouring mountains contain some green valleys, where the wealthy inhabitants have their country-houses. During the 15th and 16th centuries Toledo was celebrated for its manufactory of sword-blades, as well as for its silks; the fabrication of the former still continues under the patronage of the government.

(Miñano, *Diccionario Geográfico.*)

TOLE'DO, DON PEDRO DE, a younger son of Frederic of Toledo, duke of Alba, was born at Alba de Tormes, near Salamanca, in 1484. After going through his early studies he was placed as a page in the court of King Ferdinand the Catholic, through whose influence he obtained the hand of Donna Maria Osorio, heiress of the house of Villafranca, in consequence of which he took the title of Marquis of Villafranca, and the possession of the rich estates attached to it. In 1532 Charles V. appointed him viceroy of Naples. He found the kingdom suffering from the consequences of the preceding foreign and civil wars, and in a state of confusion bordering upon anarchy. The first care of the new viceroy was to enforce the rigorous administration of justice without respect for persons, and he made the strictest regulations for the preservation of public order and morality. He introduced many other reforms, and greatly embellished Naples with new buildings, &c. He also drained the neighbouring marshes by opening the wide canal called Dei Lagni, which carries the superfluous waters into the sea.

In consequence of these and other services Don Pedro de Toledo had become very popular, until, in the year 1547, he attempted to establish the Inquisition, when he became universally disliked. The tumult which followed was presenting a formidable aspect, when he signified the will of the Emperor that the Inquisition should not be established in Naples.

In July, 1552, a large Turkish fleet anchored at the entrance of the Bay of Naples, where the emigrant prince Sanseverino of Salerno was to have joined them with a French squadron; but the viceroy, it is said, by means of a large bribe, induced the Turkish commanders to leave the coast before the arrival of the French. Towards the end of the same year the viceroy was directed by Charles V. to march to Siena in Tuscany, which republic had thrown off the protection of the Emperor and admitted a French garrison. On arriving at Leghorn he fell seriously ill, and was removed to Florence, where he expired Feb., 1553. He is by far the most distinguished in the long list of the Spanish governors of Naples.

TOLE'DO, TABLES OF. The Moors brought astronomy into Spain at the beginning of the 11th century, and about the year 1080 tables were calculated for the meridian of Toledo, by Arzachel. The theory and numerical quantities employed are in almost every instance those of Ptolemæus.

TOLERATION ACT. [NONCONFORMITY.]

TOLL, from the Saxon 'tolne,' in German, 'zoll,' is a payment in money or in kind, fixed in amount, made either under a royal grant, or under a usage from which the existence of such a grant is implied, in consideration of some service rendered, benefit conferred, or right forborne to be exercised by the party who is entitled to such payment.

If a corporation, or the owner of particular lands, has immemorially repaired the streets or walls of a town, or a bridge, &c., and in consideration of the obligation to repair, has immemorially received certain reasonable sums in respect of persons, cattle, or goods passing through the town, such sums are recoverable at law by the name of *toll-thorough.*

An ancient toll may be claimed by the owner of a port in respect of goods shipped or landed there. Such tolls are port-tolls, more commonly called *port-dues.*

Another species of toll is a reasonable fixed sum payable by royal grant or prescription to the owner of a fair or market, from the buyer of tollable articles sold there. It is not due unless the article be brought in bulk into the fair or market, though a person cannot sell by sample, in order to avoid the payment of the toll. In some cases, by ancient custom, a payment, called *turn-toll,* is demandable for beasts which are driven to the market and return unsold. The term toll is sometimes extended to the compensation paid for the use of the soil by those who erect stalls in the fair or market, or for the liberty of picking holes for the purpose of temporary erections; but the former payment is more properly called *stallage,* and the latter *picage.*

If tolls are wrongfully withheld, the party entitled may recover the amount by action as for debt; or he may seize and detain the whole or any part of the property in respect of which the toll is payable, by way of distress.

The term toll is used in modern acts of parliament to designate the payment directed to be made to the proprietors of canals and railways, the trustees of turnpike-roads or bridges, &c., in respect of the passage of passengers or the conveyance of cattle or goods.

TOLNA. [Hungary.]

TOLOZA. [Basque Provinces.]

TOMAHAWK, an Indian hatchet. The tomahawks of Indian manufacture are headed with stone, but the ordinary metal blades or heads are of European manufacture, and made expressly for Indian use. The handles are usually made by the Indians themselves, and are often highly ornamented. Some tomahawks are formed with a bowl for burning tobacco in the head, and a hole through the handle to serve for a pipe.

TOMATO. [Solanum.]

TOMB (in Greek τύμβος ; low Latin, *Tumba ;* Italian, *Tomba :* French, *Tombe* and *Tombeau*) signifies, in its strict meaning, a mass of masonry or stone-work raised immediately over a grave or vault used for interment; but it is often applied, in a wider sense, to any sepulchral structure.

Of primitive sepulchres there are two classes—both of high antiquity,—one subterraneous and excavated; the other, of raised mounds or tumuli heaped over the dead. Monuments of the first kind are numerous in Egypt; and the Pyramids, though more artificial in form and construction, had no doubt a common origin with the Tumulus, which forms the other class, and occurs under various designations in every part of the globe.

The extraordinary labour bestowed in excavating or constructing these ancient sepulchres is perhaps not so surprising as the lavishness with which the ancients embellished the subterraneous abodes of the dead, not only adorning them with polychromy and paintings, but depositing in them the most costly and exquisitely-wrought articles. The tombs in Egypt and Etruria prove not only the perfection the mechanic arts had attained, but also the luxurious refinement of those remote ages. At some places in Etruria—Orchia, the modern Norchia, and Axia, now called Castel d'Asso—the tombs are hewn out on the sides of rocks and hills, and present an architectural frontispiece or façade forming their entrance, as is the case with some Egyptian tombs, and likewise with those which are found in Lycia, and other parts of Asia Minor. Many of the Lycian tombs have columns and entablatures to their façades wrought out of the solid rock.

Sepulchral edifices are numerous throughout Latium and Magna Græcia, many of which must have been very conspicuous objects, and remarkable on account of the studied architectural decoration bestowed on them externally.

The tombs of the middle ages are within buildings, churches, chantries, cloisters, &c., and exhibit almost every variety of form and enrichment, from the primitive stone coffin to those lavishly-decorated canopied monuments which are so many piles of architecture combined with sculpture. Some are very little raised above the floor, and their upper surface forms a ridge-shaped lid. Another class consists of *Altar* or *Table Tombs*, comparatively plain, although with panelling or other architectural decoration on their sides. The next in order is the *Effigy Tomb*, first introduced in the 13th century, with a recumbent figure of the deceased upon it, extended, with the hands slightly raised, and joined as if in the attitude of prayer.

Altar and Effigy Tombs were usually placed between the piers of an arch, or within a recess in a wall, and in either case the whole tomb was frequently covered by an arch forming a sort of canopy over it; of which kind is that of Aymer de Valence in Westminster Abbey. In course of time this mode of decoration came to be greatly extended. Instead of a single arch, three or more small arches were introduced, which, with the columns either supporting or placed between them, enclosed the figure on the tomb, giving the whole the appearance of a *Shrine* or *Screen*.

In Italy there are many examples of what may be called *Façade Monuments*, which are extensive architectural compositions, consisting of two or more orders of columns, with pediments, niches, statues, panels, and various other architectural decorations. In many of these monuments the sepulchral character is completely wanting,—as in the tombs of Giuliano and Lorenzo de' Medici, by Michel Angelo; and later sculptors have frequently given allegorical compositions and groups of mythological figures, while the likeness of persons intended to be recorded is shown only in a medallion.

TOMBS, VAULTS, TOMBSTONES, TABLETS. It is our intention here to show what rights persons in this country have, 1st, to burial, and 2ndly, to a permanent commemoration of themselves by means of monuments. But we treat here only of parish churches and churchyards, or of the parish burying-grounds subsidiary to the churchyard. The cemeteries which have been established in the neighbourhood of many populous towns are private property.

By the 68th Canon of 1603 it is ordered that no minister shall refuse or delay, under pain of suspension by the bishop for three months, to bury any corpse that is brought to the church or church-yard (convenient warning being given him thereof before), in such form as is prescribed by the Book of Common Prayer, unless the deceased were excommunicated *majori excommunicatione*, and no man able to testify of his repentance. The Rubrick further excludes from Christian burial those who have not been baptised or who have died by their own hands; and this latter class are defined to be such as have voluntarily killed themselves, being of sound mind.

This right of sepulture however applies only to the body: the Canon and the Rubrick alike talk, as though studiously, of the 'corpse' alone, never mentioning the coffin. In former times the use of coffins was confined to the richer classes, and these were often of stone or of other durable materials; but the practice and no doubt the intention was that in the great majority of cases the process of decay, and therefore the occupation of the earth, should not be needlessly protracted. To use the words of Lord Stowell, 'A common

cemetery (by which he means a churchyard or parish burying-ground) is not the property of one generation now departed, but is likewise the common property of the living and of generations yet unborn, and is subject only to temporary occupations.' On this doctrine are based the main points of the law concerning burials.

The establishment of churchyards is attributed to Cuthbert, archbishop of Canterbury, who in the year 750 introduced into this country the Roman custom of devoting an enclosed space round the sacred edifice to the interment of those who had been entitled to attend or had been in the habit of attending divine worship within its walls. Notwithstanding a canon which forbade it, the clergy interred persons of peculiar sanctity or importance within the walls of the church, so as to remind the faithful of their example and of the duty of praying for their souls: and hence the rule that a body cannot now be buried in the church without the consent of the incumbent. Anciently no fees were taken for the use of the churchyard: nevertheless the payment of fees to the clergyman dates, in this country at least, from the Reformation. The fee is not a price paid for the burial, but an offering to the minister; and the claim to it is founded on custom. The churchwardens are also entitled to a fee for burials in the church, since on them falls the expense of repairing the pavement. These fees are matters of ecclesiastical jurisdiction, and if they deviate from the amounts established by custom, must be approved by the ordinary after consulting the minister and the parishioners.

A vault cannot properly be made either in the church or churchyard, without the consent of the ordinary signified by a faculty, that is, a licence or permission for that purpose; and this he does not grant until he has given the parson and parishioners an opportunity to express their opinions. A vault may be attached by prescription to a mansion; or again, the proprietors of a mansion may have a prescriptive right to be interred and to erect a tablet or tombstone in the aisle or chapel appurtenant to that mansion.

The placing of a monument in the church or a tablet on its walls is also within the jurisdiction of the ordinary; for the fixing of it in the chancel the consent of the rector is required. To remove without the ordinary's consent a monument or tablet once erected is an offence which subjects to prosecution before the ecclesiastical courts the party committing it, even though he should have himself erected the monument, and should have the consent of the incumbent for its removal.

The inscription upon a tombstone is a matter of ecclesiastical discipline, and an epitaph is unlawful which is contrary to the canons of the church which are in force at the time when the inscription is made.

TOMSK. [Siberia.]

TON or TUN. In modern English spelling the *ton* is a weight (twenty hundredweight, or 2240 lbs. averdupois), and the *tun* is a measure of wine (two pipes, or 252 gallons).

TONBRIDGE, or TUNBRIDGE. [Kent.]

TONGA BEAN. [Coumarouna.]

TONGA ISLANDS. [Friendly Islands.]

TONGRES. [Limburg, *Belgian*.]

TONGUE. The human tongue has a very complex structure, in correspondence with the variety of its offices as an organ both of sensation and of voluntary motion. The sensations which are perceived by means of the tongue are of two kinds, namely, that of taste and that of touch or tact; its motions are chiefly subservient to speech and to the prehension and swallowing of food. The sensitive apparatus of the tongue is contained in the membrane which covers it; its motor apparatus forms its interior.

The surface of the tongue is covered by a membrane continuous at the sides and lower part with that which lines the mouth and cheeks, and covered by a fine cuticle which is constantly kept moist by the saliva and by the secretion from the tongue itself. The membrane on the inferior surface of the tongue is thin, smooth, and transparent; at the middle line it forms a vertical fold which extends nearly to the tip of the tongue, and is named the frænum linguæ. The membrane on the sides and upper part of the tongue is thicker and more vascular, and bears the papillæ, the most sensitive parts, which are thickly set over its whole surface.

The papillæ of the tongue are of different forms and sizes. They are very vascular, and receive filaments of the sensitive nerves of the tongue. Their structure is similar to that of the sensitive papillæ of the skin [Skin], except that the cuticle covering them is much thinner; and their chief office is also similar, but it is probable that each kind of papillæ is subservient to a different kind of sensation.

The interior of the tongue is composed entirely of muscles, and of the fat and cellular tissue which lie between their fibres. These muscles are named, after the parts to which they are attached, the hyo-glossi, stylo-glossi, genio-hyo-glossi, and linguales. It is by the agency of these muscles that the various movements of the tongue are produced.

But besides these muscles, and variously intermingled with their fibres, the tongue contains numerous other irregular fasciculi, of which no description can be given. It is also variously influenced by the muscles which move the soft palate and its arches and the hyoid bone. From the variously-combined actions of them all, the tongue is made capable of more rapid, more varied, and (for its size) more extensive motions than any other organ in the body.

At the posterior part, or root, of the tongue, numerous small glands are imbedded in its substance. They have a structure similar to that of the labial, palatine, and others of the smaller salivary glands, and probably secrete a similar fluid, which serves to lubricate the passage for the food from the mouth to the fauces.

The tongue is supplied with three different pairs of nerves:—1. The hypoglossal, or ninth pair of nerves, are distributed almost exclusively in the muscles of the tongue: they are its motor nerves; and when they are paralysed or divided the tongue is rendered immoveable, but its sensations are un-

impaired. 2. The lingual (or, as they are sometimes called, the gustatory) branches of the fifth pair of nerves are those on which the sensibility of the tongue to all common impressions of touch, heat, cold, &c., depends. They are distributed most abundantly in the papillæ at and near the tip of the tongue, and they endow it with a sensibility more acute than that possessed by any part of the skin. 3. The gustatory, glosso-pharyngial, or eighth pair of nerves, of which a considerable part is distributed in the tongue, are probably those on which the peculiar sense of taste depends.

The quality by which substances are capable of exciting the sensation of taste is altogether unknown, nor has even a probable hypothesis been formed.

TONICS. [ANALEPTICS.]

TONKIN, or TONQUIN. [COCHIN-CHINA.]

TONNAY-CHARENTE. [CHARENTE-INFÉRIEURE.]

TONNEINS. [LOT-ET-GARONNE.]

TONNERRE. [YONNE.]

TÖNNINGEN. [SCHLESWIG AND HOLSTEIN.]

TONQUIN, or TONKIN. [COCHIN-CHINA.]

TONSILS. The tonsils are two complex glands, one of which lies on each side of the fauces, between the arches of the soft palate. They are of an elongated oval form, and each is composed of a number of smaller glands aggregated together in one mass, and usually opening by several orifices on the surface of the mucous membrane.

They are very subject to inflammation. In its acute form this disease constitutes the most frequent kind of sore-throat. [QUINSY.] Either after acute inflammation, or independently of it, the tonsils are also very subject to a chronic enlargement, which gives rise to a permanent difficulty of swallowing, with a peculiar nasal tone of voice, and often considerable dyspnœa. With the last symptom there is often combined a peculiar loud snoring during sleep; and, in children, it produces a deformity of the chest by the elevation and increased convexity of the sternum, which are the consequence of the habitually increased efforts of inspiration. This disease is very frequent in scrofulous persons, especially during childhood, and may sometimes be cured by attention to the general health, and by the use of powerful astringent or acid gargles; but, in general, the quickest and best remedy is to cut off the prominent portions of the tonsils, an operation which is scarcely painful, and may be performed, either with a blunt-pointed knife, or with an instrument of recent invention, called a guillotine.

TONSTALL, or TUNSTALL, CUTHBERT, was born at Hatchford, in Yorkshire, in 1474 or 1475. About 1491 he was sent to the university of Oxford; but the plague drove him to Cambridge, where he became a fellow of King's Hall (now incorporated with Trinity College). After this he studied at Padua, and having there taken the degree of doctor of laws, returned to England with a high reputation for classical, legal, and scientific, as well as for theological learning. Warham, Archbishop of Canterbury, in 1511, made him his vicar-general, and collated him to the rectory of Harrow-on-the-Hill. In 1514 he was made a prebendary in the cathedral of Lincoln; in 1515 he was admitted archdeacon of Chester: and in May, 1516, he was appointed master of the rolls. Towards the close of this same year he was sent to Brussels as chief commissioner to Charles, king of Spain (afterwards the Emperor Charles V.), with whom he concluded treaties of alliance and commerce; and here he made the acquaintance of Erasmus. In 1519 he was collated to a prebend in the Cathedral of York; and in 1521 to another in that of Salisbury, of which diocese he was also elected dean. The next year he became bishop of London, and resigned his office of master of the rolls; but in May, 1523, he was made lord privy seal. He was sent to Spain on an embassy to the Emperor in 1525; accompanied Cardinal Wolsey in his embassy to France in 1527; and along with Sir Thomas More represented the English king at the negociation of the treaty of Cambray in 1529. In 1530 Tonstall was translated to the bishopric of Durham; and resigned the privy seal. During the religious changes of this reign he preached and wrote in favour of the king's ecclesiastical supremacy; and, along with Heath, bishop of Rochester, he revised the English translation of the Bible which was published by authority in 1541. On the accession of Edward VI., in 1547, he retained his seat in the privy council, and was also made a member of the king's council in the north. In May, 1551, however, he was accused of being privy to the design of an insurrection in the north; upon which he was committed to the Tower, and eventually (Oct. 14, 1552) deprived of his bishopric by a commission consisting of the Chief Justice of the King's Bench and seven others—the House of Commons having previously refused to pass a bill for the purpose. He remained a prisoner during the remainder of King Edward's reign, but on the accession of Mary he was released and reinstated in his bishopric. Tonstall distinguished himself throughout this reign by his moderation. No burnings of heretics took place in his diocese; and he was suspected on this account of being half a Protestant at heart. Nevertheless when Elizabeth came to the throne he refused to take the oath of supremacy; and he was deprived on that account, in July, 1559. He was committed to the charge of his friend Parker, already nominated archbishop of Canterbury, and he lived at Lambeth till his death, Nov. 18, 1559.

Tonstall, besides short compositions, some in print, some in manuscript, is the author of 'De Veritate Corporis et Sanguinis Domini Nostri Jesu Christi in Eucharistiâ' (in defence of Transubstantiation), 4to., Paris, 1554. 'Compendium et Synopsis,' &c., an abridgment of Aristotle's Ethics, 8vo, Paris, 1554. 'Contra Impios Blasphematores,' &c., a defence of Predestination, 4to., Antwerp, 1555.

TONSURE (from the Latin *tondere*, 'to clip,') is the name given to a distinguishing mark of the clergy of the Roman Catholic church, formed by cutting off the hair from a circular space on the top of the head. It was probably introduced not earlier than the latter part of the fifth

entury. Various explanations of its mystical meaning have been proposed: one theory is, that t is a sign of adoption by the church; another, hat it is intended to symbolise the clerical subjection and obedience; another, that it is a memorial f the Saviour's crown of thorns, &c.

TONTINE, a species of life annuity, so called rom Lorenzo Tonti, a Neapolitan, with whom the cheme originated, and who introduced it into France, where the first tontine was opened in 653. The subscribers were divided into ten lasses, according to their ages, or were allowed to ppoint nominees, who were so divided, and a roportionate annuity being assigned to each class, hose who lived longest had the benefit of their urvivorship, by the whole annuity being divided mongst the diminished number. The terms of his tontine may be seen in the French 'Encyclo-édie' ('Finance' division, vol. iii., p. 704). In 689 a second tontine was opened in France. The ast survivor was a widow, who, at the period of er death, at the age of 96, enjoyed an income of 3,500 livres for her original subscription of 300 ivres.

TOOKE, JOHN HORNE, was the son of John Horne, a poulterer in Newport Street, Westminster, where he was born June 25, 1736. He was educated at Westminster School and at Eton. n 1755 he went to St John's College, Cambridge, nd took his degree of B.A. in 1758. After leaving Cambridge he officiated for a short time as sher in a school at Blackheath, and in 1760 took eacon's orders, and obtained a curacy in Kent. He entered the church in compliance with his ather's wishes, and after having become a student f the Inner Temple. In 1760 he received priest's rders; and in the course of the same year was nducted to the chapelry of New Brentford, which is father had purchased for him. He however mbraced the opportunity of leaving New Brentord for more than a year upon two different occaions, in order to travel on the Continent as tutor.

On his second return from the Continent in 767, Horne took an active part in the political ontests of the day. His opposition to the ministry was unceasing, and he became one of the most opular men of the day. He was the founder of he 'Society for supporting the Bill of Rights,' in 769, in which he was closely associated with Wilkes; but in the following year a quarrel took lace between them, in consequence of which Horne ost much of his popularity. His quarrel with Wilkes drew upon him in the same year the ttack of Junius, whom he answered with great uccess.

In 1773 he resigned his living with the view of udying for the bar. While prosecuting his legal udies, he afforded assistance to Mr. William ooke, an old friend of his, in resisting an enclore bill, which would have deteriorated the value some property which Tooke had at Purley, in urrey. In return for his services Mr. Tooke ade him his heir; and Mr. Horne thence assumed he name of Tooke.

On the breaking out of the American War, ooke opened a subscription for the widows and phans of the Americans, 'murdered,' as he said, 'by the king's troops at Lexington and Concord.' The ministry prosecuted him for a libel in 1777; he was found guilty, condemned to pay a fine of 200*l.*, and to be imprisoned for twelve months. While in prison he published his letter to Mr. Dunning. Shortly after his release, he applied in 1779 to be called to the bar, but he was rejected by the benchers on the ground of his being a clergyman. He had however previously published, in conjunction with Dr. Price, a pamphlet against the American War, entitled 'Facts' addressed to the landholders, stockholders, &c. of Great Britain. After a short absence from London, he returned, and took an active part in advocating the cause of parliamentary reform, which Mr. Pitt then espoused. He continued to support Mr. Pitt's party for some years, and when Mr. Fox came into power, he published his celebrated 'Two Pairs of Portraits,' 1788. Two years previously to this he published the first volume of his 'Επεα Πτερόεντα,' or the 'Diversions of Purley.'

In 1790 Tooke became a candidate to represent the city of Westminster in parliament; but was not returned. In 1794 he was arrested on a charge of high treason, mainly on account of his connection with the 'Constitutional Society.' Nothing however of a treasonable nature could be proved against him, and he was acquitted after a trial which lasted six days, during which he distinguished himself by his calmness, intrepidity, and presence of mind. His domestic affairs having become embarrassed, his friends came forward to his assistance and settled on him a pension of 600*l.* a year. In 1796 he again offered himself as a candidate for Westminster, and was again unsuccessful. It was only by being returned in 1801 for the borough of Old Sarum by Lord Camelford, that he succeeded in getting a seat in parliament. He retained his seat till the dissolution of parliament in the following year, but was disqualified from sitting again in consequence of an act passed while he was in the house rendering all persons in priest's orders ineligible as members.

Mr. Tooke now retired into private life, and passed the remainder of his life at Wimbledon. He had published a second edition of the 'Diversions of Purley' in 1798, and this was now followed by the second volume in 1805. He died March 18, 1812.

TOOKE, REV. WILLIAM, was born Jan. 18, 1744, and educated at a private academy at Islington. He was ordained in 1771 by the Bishop of London, and shortly afterwards obtained the situation of minister of the English church at Cronstadt. In 1774 he was appointed chaplain to the factory of the Russia Company at St. Petersburg, in which situation he remained for eighteen years. He returned to England in 1792, in consequence of succeeding to a property. He died in London, Nov. 17, 1820.

Mr Tooke was the author of several works, of which the most important are those relating to Russia, namely, a 'Life of Catherine II.,' 3 vols. 8vo.; 'A View of the Russian Empire,' 3 vols.; and 'A History of Russia, from the Foundation of the Empire to the Accession of Catherine II.' Mr. Tooke was also a joint editor with Archdeacon

Nares and Mr. Beloe, of the 'General Biographical Dictionary,' in 15 vols. 8vo., 1798; his portion of the work was the first five volumes.

TOONGUSES. [SIBERIA.]

TOOTING. [SURREY.]

TOPAZ occurs massive, in imbedded and rounded crystals. The primary form of the crystal is a right rhombic prism. It is harder than quartz. The colour varies from white to a greenish-blue, and is translucent. Fragments exposed to heat emit a blue, green, or yellowish phosphoric light. By the blow-pipe on charcoal the topaz does not fuse, but with borax it melts into a transparent glass. Topazes occur generally in primitive rocks, and in many parts of the world, as Cornwall, Scotland, Saxony, Siberia, Brazil, &c., &c. They consist of alumina and silica, with a little fluoric acid.

TOPOGRAPHY from the Greek τοπογραφία, which is from τόπος, 'a place,' and γράφειν, 'describe'). Perhaps the nearest corresponding combination of English words would be 'place-description.' The word Topography is limited by usage to the description of cities, towns, villages, castles, churches, and other artificial structures, including notices of everything belonging to the places or connected with them; for instance, not only the site, construction of the streets, public buildings, &c., of cities and towns, but the number of inhabitants, trade, history, and so forth. The word occurs in the Greek writers. Cicero ('ad Attic.,' i. 13) uses *Topothesy* (τοποθεσία) as synonymous with topography, though topothesy should have a different meaning. (See an 'Essay on the Study of Geography,' by George Long, in the 'Schoolmaster,' vol. ii.) In the Greek 'topography' has a wider meaning than it has with us.

TOPSHAM. [DEVONSHIRE.]

TORDESI'LLAS, a small town of the province of Valladolid in Spain, situated on the right bank of the Douro, in 41° 28′ N. lat., 5° 2′ W. long., and contains 4000 inhabitants. In the reign of Ferdinand and Isabella the population is said to have amounted to 50,000. The town, which is commanded by a fine castle, is the birthplace of Alonso Fernandez de Avallanada, the continuator of 'Don Quixote.' (Miñano, *Diccionario Geográfico*, viii. 472.)

TORDY'LIUM, a genus of plants belonging to the natural order *Umbelliferæ*. *T. maximum*, Great Hartwort, is native of the middle and south of Europe, and England, in corn-fields. *T. officinale*, Officinal Hartwort, has white flowers, and was formerly used medicinally.

TOREA. The reference to this word in the article CASTEL, CASTELLO, is a typographical misprint for *Ivrea*. [TORINO.]

TORELLI, LAELIO, was born at Fano, on the 28th of October, 1489. While yet a mere boy he was entrusted to the care of his maternal uncle, Jacopo Costanzi, a professor in the university of Ferrara, under whom he made a respectable progress in the Greek and Latin languages. He subsequently studied law in the university of Perugia, and obtained the degree of doctor in his 22nd year.

From 1511 to 1527 Torelli remained in the civil service of the Roman government. Soon after taking his degree he was appointed podestà of Fossombrone, and in a short time chief-magistrate of his native town. He was afterwards appointed govenor of Benevento. About 1527 he retired to Florence.

In 1531 he was appointed one of the five auditors of the Rota of Florence, and he continued from that time till his death in the service of the Medici family. Torelli rose to be podestà of Florence; he was subsequently appointed chancellor by the grand-duke, and in 1546 his principal secretary. His official duties did not entirely withdraw him from literary pursuits. He was an active member of the Florentine Academy. His reputation as a statesman and a man of letters procured him the honour of being elected a senator. He died in March, 1576, having survived all his children.

The work which has preserved the name of Torelli is his edition of the Florentine manuscript of the 'Digest' or 'Pandect.' It was printed at Florence by L. Torrentino, printer to the grand-duke, in 1553; and it is a fine specimen of typography. The MS. is the oldest copy of the entire Pandect which exists. It was brought to Florence in 1406 from Pisa, after the capture of Pisa by Gino Caponi.

TORELLI, GIUSEPPE, an Italian mathematician, was born at Verona, in 1721. He is chiefly distinguished by his edition in Greek and Latin of all the works of Archimédes. The manuscript was sold after his death to the university of Oxford, and the work was published, in 1792, by the curators of the Clarendon Press. He died in 1781.

TORENIA, a small genus of plants of the natural family of *Scrophularineæ*, is found in India, the tropical parts of New Holland, and in South America. *T. Asiatica* is a species found in almost every part of India.

TORFAEUS, or TORMO'DUS, were the assumed literary names of Thormod Thorveson. He was born at Engoe, a small island on the southern coast of Iceland, of poor parents, but he had a good education at the Latin school at Skalholdt. Upon his arrival in Copenhagen, his choice and fluent Latin surprised the professors. In the year 1654 he was entered as a free student at the university of Copenhagen, where he remained till the year 1657. In the year 1659 he was captured and made prisoner by a Swedish privateer on his return from Christiansand in Norway. Upon his release and return to Copenhagen, king Frederick III. appointed him interpreter of Icelandic manuscripts, and a short time afterwards sent him to Iceland for the purpose of collecting manuscripts. The collection which he brought back, and which is still preserved in the Royal Library in Copenhagen, is considered the best in the world for ancient Scandinavian history and literature. In 1667, he was appointed keeper of the king's collection of antiquities. During his return from a voyage to Amsterdam he was shipwrecked at Skagen; and on his journey by land to Copenhagen, he was insulted and attacked in a small town in Sealand by one of his countrymen, whom, in defending himself, he accidentally killed. He was tried, and sentenced to death, but though his sentence was

commuted to a fine, he lost his place. He then retired to a small farm in Norway, where he lived without any official employment till 1682, when Christian V., having succeeded to the Danish throne, appointed him royal historiographer, and assessor in the consistory, or board of education, with a salary sufficient to enable him to pursue his studies. He finished his most important work, the 'History of Norway,' as far as the Union of Calmar, when ill health compelled him to surrender his favourite task to his friend Professor Reitzer. In 1719 he died, very far advanced in years, without issue. His works, printed, as well as in MS., are very numerous, and exhibit deep knowledge and indefatigable research into ancient Scandinavian history. His MSS. are preserved at the Royal Library in Copenhagen.

TORGAU. [MERSEBURG.]

TORILIS, a genus of plants belonging to the natural order *Umbelliferæ*. *T. anthriscus* is native of Europe and Caucasus, and is plentiful in Britain. *T. infesta* is found on fields and waste places in Europe and Great Britain.

TORINO, a division of the continental territory of the kingdom of Sardinia, is bounded W. by the Alps, which divide it from France and Savoy, N. by the division of Aosta, E. by those of Novara and Alessandria, and S by the division of Cuneo. It is divided into 5 provinces, which, with their respective areas and population, are as follows:—

Provinces.	Area in sq. m.	Pop. in 1840.
Torino . . .	1117	379,677
Biella . . .	375	128,025
Ivrea . . .	562	160,574
Pinerolo. . .	593	126,998
Susa. . . .	539	78,036
Total . .	3186	873,310

The Cottian and Graian Alps, with their ramifications between Monte Viso and Mont Iseran, cover all the north and west of the division, forming a great number of valleys, which are drained by rivers that enter the Po on the left bank. The rest of the division is mostly level, forming part of the great plain of the Po. The principal river is the Po, which enters the division from that of Cuneo on the south, and runs nearly due N. as far as Turin, whence it flows N.E to Chiavasso, and then runs E. by S., leaving the division below Verrua. Its principal feeders in this division are the Chisone, the Sangone, and the Dora-Riparia, which have nearly an eastern course, and the Stura, the Orca, the Dora-Baltea, and the Cervo, which flow into the Po in a general south-eastern direction. Besides Monte Viso and Mont Iseran, the most remarkable summits are those of Mont Genèvre and Mont Cenis, over the depressions near which are the fine roads formed by Napoleon connecting Turin with Briançon and Chambery. [ALPS.] Railroads are in course of construction to Alessandria, and through Novara to Milan. The project of cutting a tunnel through the Alps under the ridge of Mont Cenis, from the head of the valley of Bardonnèche, which opens into that of the Dora-Riparia and Modane on the Savoy side, has been for some time entertained. It is to be cut by machinery, worked by the water power of the mountain-streams, and to be 7 miles in length.

The bulk of the population is engaged in agriculture and cattle feeding. The number of horned cattle fed on the mountains and other pastures is very great. There are comparatively very few horses: oxen are used in the plough and for draft; pigs are numerous. The chief products are wheat, maize, rice, barley, chestnuts, beans, some oats, potatoes, fruits, good wine, silk, hemp, and flax. There are extensive forests on the mountains, which contain iron and copper ore, marble of different colours, &c. The manufactures are named under the towns.

Pinerolo or *Pignerol*, the most southern province of the division, occupies the basin and valley of the Chisone, into which several deep lateral valleys open. Corn, excellent fruits, good wine, chestnuts, and silk, are the chief products. The forests are extensive, and there is a great breadth of mountain-pasture, on which large numbers of cattle are fed. *Pinerolo*, a walled town and a bishop's see, near the left bank of the Chisone, has several churches and convents, a handsome cathedral, a large hospital, several manufactories of silk, woollens, and leather, and about 13,000 inhabitants. *Villafranca-di-Piemonte*, situated in a fertile country near the confluence of the Chisone with the Po, contains 7600 inhabitants. *Cavour*, on the southern boundary not far from the Po, has 6400 inhabitants. *Fenestrelle*, in the valley of Pratgelat, at the foot of the high Alps, is a small town with about 800 inhabitants: it is remarkable for its fortress situated on a bleak mountain in which Napoleon confined Cardinal Pacca and numerous other state prisoners. The fortress is used as a state prison by the present Sardinian government, which lately shut up in it the Archbishop of Turin. *Cumiana* has 5000 inhabitants.

The province of Torino lies N. of Pinerolo occupying the lower portion of the valleys of the Sangone, the Dora-Riparia, the Stura, and the Orca; it comprises a large extent of level fertile land, including the fine plain of the Po, on the right bank of which river the province stretches into the duchy of Monferrato, as far as the watershed between the Po and the Tanaro, which is formed by a line of hills that runs nearly due N. along the meridian of 8° E. Extensive forests and pastures, abundant wheat-crops, wine, and silk, form the elements of the wealth of this country; iron, vitriol, marble, and lime, are the chief minerals. The industrial and commercial activity is considerable. The principal towns are:—TURIN: *Rivoli*, W. of Turin, on the road to Susa, which has 5300 inhabitants; manfactories of linen and woollens, and a royal palace: *Chieri*, a well-built town of 12,000 inhabitants, which is situated on the hills of Monferrato, 6 miles E. of Turin, and has several churches and convents, palaces, and an important silk-market: *Moncalieri*, which stands on the right bank of the Po, S. of Turin, and has a royal palace, and 7300 inhabitants: *Carignano*, a town of 7000 inhabitants, in a fertile plain on

the left bank of the Po, 11 miles S. of Turin: *Carmagnola*, on the right bank of the Po, which has important weekly markets for silk, corn, hemp, oil, soap, cheese, cattle, &c.; population, 12,000: *Chivasso*, a town of 7000 inhabitants, which is situated on the left bank of the Po, near the confluence of the river Orca, 12 miles N.E. of Turin, in a plain abounding with wheat and rice fields and cattle: *Rivarolo*, in the valley of the Orca, population, 5000: and *Poirino*, on the road to Alessandria, with 5600 inhabitants.

The province of Susa lies N. of that of Pinerolo, and between the high Alps and the province of Torino. A great part of the province lies on the slope of the great Alpine ridge, which here forms the groups of Mont Cenis and Mont Genèvre. The Dora Riparia, rising on Mont Genèvre, crosses the province in its length from east to west, and passes Susa the capital of the province. The valley of Susa is fertile, and produces corn, wine, flax, hemp, and mulberries. The highlands produce abundance of chestnuts, and afford good summer pasture. The great road from Turin to Savoy and France over Mont Cenis ascends the valley of the Dora Riparia as far as Susa, and then turns to the northward, over Mont Genèvre to Briançon in Dauphiné. Another carriage road runs up the valley through Exilles, Oulx, and Cesanna. *Bussolino*, a village on the high road to Turin, has a quarry of green marble, which resembles the verde antico of the ancients; and lower down is the town of *Avigliana*, with 3000 inhabitants, in a very fruitful country. *Susa*, the ancient *Segusium* or *Segusio*, the head town of the province, is a bishop's see, and has about 3200 inhabitants. North of the town is a triumphal arch of white marble, 40 feet high and 25 wide, raised in honour of Augustus, which stands across the ancient Roman road to Gaul. The town is old and ill built, several of the streets are lined with low arcades, and some good houses are seen here and there belonging to the provincial nobility. It has a royal college, a provincial court, and some manufactories of leather, gloves, and thread.

The province of Ivrea, sometimes called *il Canavese*, from the quantity of hemp (canapa) it produces, lies N. of the province of Turin and S. of the division of Aosta from which it is divided by a spur that runs eastward from Mont Iseran to the Dora-Baltea. It comprises the upper part of the basin of the Orca to a little below Cuorgnè, and the basin of the Dora-Baltea between fort Bard and the lake of Viverone, near which it borders upon the province of Vercelli on the south east. The surface N. of Ivrea, which is situated at the entrance on the great plain, is traversed by offshoots of the Alps, forming numerous picturesque and fertile valleys. The soil produces abundantly corn, excellent wine, and hemp. The pastures are good and cattle very numerous; silk is an important product. The plain and the valleys are made very productive in parts by a system of irrigation connected with the Dora-Baltea and other streams. Chestnuts are very abundant on the mountains. Iron, copper, marble, slate, and building stone, are the chief minerals. The chief town, *Ivrea*, prettily situated on the slope of a hill above the left bank of the Dora-Baltea, here crossed by a Roman bridge of a single arch, is 27 miles N. by E. from Turin, and has about 8000 inhabitants. It is an old-looking town surrounded by walls and defended by a castle; it gives title to a bishop, has 7 churches, several convents, theological and royal colleges, and an hospital. The other towns are—*Castellamonte*, population, 5000: *Caluso*, 5400: *Cuorgnè*, with copper-works, and 3000 inhabitants: *Aglié*, with 3000 inhabitants, a castle and handsome park: *San-Giorgio-Canavese*, 3300: *Locana*, on the Orca, with brass-works and a population of 5000: *Valperga*, population, 2700: and *Ponte*, population, 2600, in a beautiful valley watered by the Orca and its feeder, the Saona.

The province of Biella lies E. of that of Ivrea, and is drained by the Cervo and the Elvo, feeders of the Sesia; on the south and east it is bounded by the division of Novara. The north of the province is covered by offshoots of the Pennine Alps, but a great part of the surface is level and very productive. The chief products are corn, rice, hemp, silk, and wine, the best in Piedmont. Cattle are very numerous. Iron and copper are found. The system of irrigation is extensively adopted. *Biella*, the chief town, situated on the slope and at the foot of a hill 36 miles N.N.E. of Turin, on the right bank of the Cervo, gives title to a bishop, has a college, a provincial court, woollen and silk manufactures, and 8000 inhabitants. There is a good trade in silk, oil, and chestnuts.

TORI'NO (corruptly called *Turin* by northern nations), the capital of the kingdom of Sardinia, situated in 45° 5′ N. lat., 7° 44′ E. long., 89 miles W. by S. from Milan, on the left bank of the Po, at the point where that river is joined by the Dora Riparia, occupies the site of the ancient Augusta Taurinorum, and has a population of 125,000. It lies in a wide and fertile valley, between the lower offsets of the Cottian Alps on the W., and the hills of Monferrato, which rise immediately above the right bank of the Po. The valley opens to the N.E. into the wide plain of Lombardy.

Turin is one of the most regularly-built towns in Europe; most of the streets being in straight lines and intersecting each other at right angles, and the squares being also of a regular form. The streets are kept cleaner than in most other Italian cities, being washed during the night by water drawn from the Dora. The buildings, though massive and lofty, are, generally speaking, plain, chiefly built of brick, and their appearance is uniform and monotonous. The town is about one mile and a quarter in length and little more than half a mile in its greatest breadth: it was formerly surrounded by ramparts, which have been razed, and replaced by additional buildings and promenades. The citadel, which is regularly constructed, and one of the strongest in Italy, lies outside of the town to the westward. The principal streets of Turin are those leading to the four entrances of the town, which are—Porta del Po, on the road to Alessandria and Genoa; Porta Susina, on the western or Mont Cenis road; Porta Nova, on the southern road to Saluzzo and Nice; and Porta Vittoria, leading

to Ivrea, Vercelli, Novara, and the other northern provinces. Several of the principal streets and squares are lined with arcades.

The principal square is the Piazza Castello, in the centre of the town, so called from an old castle or palace which stands in the middle of it, and which was formerly the residence of the dukes of Savoy. It has a handsome façade, ornamented with sculptures. The northern side of the square is formed by the royal palace, a vast structure, with gardens at the back of it: the apartments are handsome, and contain a rich collection of Flemish and Italian paintings, and a library. Adjoining the palace is the cathedral of San Giovanni Battista, with the annexed handsome rotunda chapel, Del Sudario, cased with black marble, and adorned with gilt bronzes. On the eastern side of the square is the great theatre, one of the largest and finest in Italy, constructed by the architect Alfieri. The university, built by King Victor Amadeus at the beginning of the 18th century, is a fine building, with a spacious court, surrounded by arcades, which are lined with ancient bassi-rilievi, and inscriptions fixed in the walls. The library of the university contains above 112,000 volumes and about 2000 MSS. The Gallery of Ancient Statues contains, amongst other remarkable objects, a Minerva, in bronze, a sleeping Cupid, a bust of the Emperor Julian, and the Isiac Table. The Cabinet of Medals contains 30,000 pieces. The Egyptian Museum, which is in the building of the Royal Academy of Sciences, is one of the richest in Europe.

The university consists of five faculties—divinity, law, medicine, surgery, and arts. Attached to it are a museum of natural history, a museum of anatomy, a chemical laboratory and hydraulic apparatus, and a botanical garden at the Valentino, outside of the town, near the banks of the Po. The Royal Academy of Sciences, begun as a private society in 1759, and instituted as an academy in 1783, consists of forty members, besides non-resident and corresponding members: it is divided into mathematical and physical sciences, and moral, historical, and philological sciences;—and has published about 30 volumes of Memoirs.

Turin has also an academy of the fine arts, a philharmonic academy, an agricultural society, a military college, and schools for deaf-mutes and the blind.

The charitable institutions of Turin are admirably conducted; they include hospitals for the infirm, for destitute children, and the old; a lying-in hospital; a lunatic asylum; a house of industry, the inmates of which are taught trades; an institution for affording out-door relief to the disabled poor; a monte-di-pietà; and two penitentiaries, one for men and the other for women.

Turin gives title to an archbishop, whose province extends over the sees of Alba, Acqui, Asti, Cuneo, Fossano, Mondovì, Ivrea, Pinerolo, Saluzzo, and Susa. It contains a great number of churches, few of which are remarkable for their external architecture. Those worthy of notice are:—San Filippo-Neri, in which are several good paintings; the Consolata; the Corpus-Domini, which is very richly decorated; Santa-Teresa, Santa-Cristina, La-Trinità, and San Carlo-Borromeo. There are numerous convents and nunneries. In the suburb, on the right bank of the Po, facing the bridge, is the church 'Della Gran Madre di Dio,' raised by the municipality of Turin, in memory of the restoration of the dynasty of Savoy, in 1814. It is an imitation of the Pantheon of Rome: it is cased with marble, and adorned with marble pillars. Higher up on the hill is the Capuchin church and convent 'Del Monte,' beautifully situated, and enjoying a splendid view of the plain of Turin, the town, the river, and the crescent of the snow-capped Alps. On a higher hill on the same side of the Po, but farther north, about 2000 feet above the sea, and five miles from Turin, is the Royal Basilica of La-Superga, containing the tombs of the princes of the house of Savoy. It is a handsome structure; its lofty dome is seen at a great distance, and is the first object that strikes the traveller on approaching Turin.

The manufactures of Turin comprise woollen cloths, silks, hosiery, hats, gloves, optical instruments, chocolate, liqueurs, tobacco, leather, paper, earthen and china-ware, carriages, arms, and tapestry.

Turin has insurance companies and an organised body of firemen; it possesses several theatres, besides the royal theatre already mentioned: the theatre of Carignano, for the opera; the theatre d'Angennes, for dramatic pieces unaccompanied by music; and the New Theatre. The nobility have a club-house. Besides the buildings already mentioned some of the town-houses of the nobility and the royal residences in the neighbourhood are deserving of notice.

TORMENTIL, *Tormentilla officinalis* (Smith), *T. erecta* (Linn.), a small perennial plant, growing in the whole of Europe and the north of Asia, in forests, bogs, and heaths. Linnæus constituted this genus, but it is sometimes regarded as a species of the genus *Potentilla*. The root, or rather the rhizoma, is officinal.

Tormentil is the most powerful of our indigenous astringents, and more easily assimilated than oak-bark or galls. Though improper in active hæmorrhages, in passive discharges it is very useful, and may be given with aromatics, or opiates, or chalk, as in the compound powder of chalk. Infusion made with cold water is preferable to the decoction. The extract made in the common way soon spoils. But valuable as this substance is in medicine, it is of still greater utility in the arts and in agriculture. It may be most beneficially employed to tan leather, both where the oak grows and where it is absent, since one pound and a half of powdered tormentil is equal in strength to seven pounds of tan. It is used in Lapland and the Orkney Isles, both to tan and to dye leather.

TORMENTILLA, a genus of plants belonging to the natural order *Rosaceæ*. Of the three species of Tormentilla, two are natives of Britain and Europe generally, and one of North America. *T. erecta*, Upright Tormentil, is abundant in barren pastures, road-sides, and bushy places in Great Britain and other countries of Europe.

It has been occasionally found with five petals, and also with double flowers. *T. reptans*, Creeping Tormentil, is a native of Europe, in much the same situations as the last. It is not so common in Britain as the last, but has been recorded as growing in many localities in Yorkshire, Essex, Norfolk, and Oxfordshire. *T. humifusa*, Trailing Tormentil, is a native of North America.

TORNADO, a whirlwind or violent storm of wind, accompanied by thunder, lightning, and rain. It frequently occurs in the West Indies, on the western coast of Africa, and in the Indian Ocean.

It has been supposed that the electric fluid, when collected in vast quantities in the atmosphere between the tropics, occasionally creates an extensive and partial rarefaction; the ambient air then rushes towards the region where this rarefaction has taken place, and the particles in their rectilineal course, being struck obliquely by currents flowing in directions which are determined by the ranges of mountains or the line of the sea-coast, acquire, by the laws of dynamics, circular or spiral motions. Thus there is formed a vortex by which terrestrial bodies within its influence are violently displaced, or the ocean is strongly agitated: on land, forests, plantations, and buildings are destroyed; and at sea, ships are engulfed or driven on shore. The effects are of course the greatest near the circumference of the vortex, and the space within which they are felt varies in extent; sometimes the diameter of the area is several miles, and at other times it does not exceed one hundred yards.

TORNEA-ELF. [BOTHNIA.]

TO'RO, the capital of a province of Spain, is an episcopal town, situated on the right bank of the Douro, on a gentle eminence which commands a view of an extensive plain, called Tierra de Campos: in 41° 45′ N. lat. 5° 37′ W. long. The collegiate church, a handsome gothic building; the remains of the Alcazar or castle, built by the Infante Don Garcia; the bridge over the Douro, built of freestone and resting on twenty-two arches, are the most remarkable structures. Near Toro was fought, in 1476, a battle, where the Portuguese under Alfonso V., were defeated by the Castilians under Ferdinand the Catholic. The population of Toro is about 10,000. (Miñano, *Diccionario Geografico de España*, viii. 480.)

TORONTO, formerly *York*, is situated on the north shore of lake Ontario, about 40 miles from the west end of Burlington Bay, in 43° 35′ N. lat. and 79° 20′ W. long. The town was founded in 1794 by Governor Simcoe. The French had previously a small palisadoed fort, a little to the west, which was called fort Tarento or Torento. With the exception of this fort and two or three wigwams, the dwellings of a few Indians, the site of Toronto, when surveyed by direction of Governor Simcoe in 1793, was uninhabited, and the country was almost entirely covered with forest to the water's edge. The district, as it was gradually cleared by the British, was called Toronto, after fort Tarento; but the name given by Governor Simcoe to the town, which he laid out on a regular plan, was *York*, which name it retained till 1834, when Sir John Colborne raised it to the rank of a city, and changed the name to that of the district, Toronto.

The situation of Toronto is low and swampy, the ground rising gradually into the back country, which is covered with forest. The site seems to have been chosen chiefly on account of the spacious and beautiful harbour, or rather bay, which is protected and nearly enclosed by a long horn of sand sweeping round in a sickle shape, and leaving only a narrow entrance, which now forms the mouth of the harbour.

The city consists of several main streets, about two miles long, and parallel to the shore of the lake, crossed at right angles by other streets which run inland about a mile. The pavements are formed of planks three inches thick, which are usually very clean. The Upper Canada College, the Cathedral, the Parliament Buildings, City Hall and Market-House, the courts of law, the banks, the churches and chapels, and many private buildings, are handsome, and indicate the flourishing condition of the city. Building-ground in the principal streets is excessively dear, and house-rent is also expensive; but provisions are abundant, and at moderate prices; and wines, fruits, and other luxuries, not dear. The fuel is chiefly wood, and is mostly burned in stoves, though coals are beginning now to be more extensively used. A house of industry, a hospital, a savings bank, a mechanics institute, and a commercial news room, are among the numerous establishments in Toronto.

Toronto has risen rapidly into importance. In 1834 its population was 9220; in 1848 it was 23,503. In respect to religion, the population of Toronto comprised 8315 Members of the Church of England, 5903 Roman Catholics, 2965 Methodists, 2547 Presbyterians, and 3773 of other denominations. Toronto was made the seat of a bishopric in 1839. Among the manufacturing establishments were—1 grit mill, 2 distilleries, 6 breweries, 2 tanneries, 4 foundries, and 1 pearl-ash factory. There is a lighthouse at the mouth of the harbour, and another at Gibraltar Point, opposite the town. The gross custom revenue for 1846-7-8 averaged about 33,000*l.* annually. About 7000*l.* per annum is realised as revenue from the lighthouse and public roads near Toronto, which were constructed with government funds.

It is a striking proof of the extent of emigration from Europe to Canada, that of the 23,503 inhabitants of Toronto in 1848, only 9219 were born in Canada.

Toronto is about 560 miles from Quebec, 390 from Montreal, 180 from Kingston, 130 from London in West Canada, and 75 from Niagara, travelling distances. Steam-vessels sail regularly from Toronto to various ports on Lake Ontario.

When the act of parliament (3 & 4 Vict., c. 35) which united the two provinces of Upper Canada and Lower Canada into one Province of Canada was carried into effect, on the 23rd of July, 1841, Toronto ceased to be a capital city, and Kingston, at the N.E. extremity of lake Ontario, became the capital of Canada West. In 1849, however, the seat of the Canadian government was transferred from Montreal to Toronto, which is now the

capital of the whole of Canada. A telegraphic communication is established between Toronto and Quebec, and a railway is in course of construction to connect Toronto with the lake Huron, through Simcoe.

TORPÉDO (*Raia Torpedo*, Linn.), called also the Electric Ray, a fish of the family *Raiidæ*, remarkable for the possession of an electrical apparatus, in the form of honeycomb-like cells, or rather hexagonal tubes, filled with mucous matter, and largely provided with nerves from the eighth pair. The situation of this apparatus is indicated on the upper surface by a slight convexity on each side of the head. Over this electric battery the will of the animal exerts a direct influence.

The shocks given by the torpedo are very considerable, and are supposed to be used by the animal both as a means of defence and to disable its prey. Mr. Couch is of opinion that this electric apparatus has further uses:—'One well-known effect of the electric shock,' he observes, 'is to deprive animals killed by it of their organic irritability, and consequently to render them more readily disposed to pass into a state of decomposition, in which condition the digestive powers more speedily and effectually act upon them. If any creature more than others might seem to require such a preparation of its food, it is the Cramp-Ray (or Torpedo), the whole canal of whose intestine is not more than half as long as the stomach.' The torpedo occurs occasionally on the British coast, and was first discovered to be a native of our seas by Mr. J. Walsh, who obtained specimens from Torbay. Col. Montagu, in his MS. notes, quoted by Mr. Yarrell, mentions having met with two examples of the torpedo: the first was of small size, and was taken at Torcross, where it was quite unknown to the fishermen; the second was taken on a turbot-hook off the coast of Tenby in Wales, and was of very large size, weighing about one hundred pounds.

Cuvier and Risso consider that under the name of *Raia Torpedo* several species have been confounded, and the latter characterises four distinct species in his 'Histoire Naturelle de l'Europe Méridionale,' viz. *Torpedo Narke*, *T. unimaculata*, *T. marmorata*, and *T. Galvani*.

(Yarrell's *British Fishes*.)

TORRE-DEL-GRECO. [NAPLES, Province.]

TORRE-DEL-ANNUNZIATA. [NAPLES, Province.]

TORRES STRAIT was named after the Spanish navigator Luis Vaez de Torres, who was the first to pass though it, which event took place in 1606. It is situated between the most north-eastern part of Australia and the southern coast of Papua or New Guinea. The reefs, which lie on the south and north of Pandora Entrance, are isolated, and surrounded by a deep sea, which extends westward about 30 miles. At that distance however occurs a most extensive reef, which runs from north to south between 9° 53′ and 11° 25′ S. lat. without a break, and by which the strait is shut up on the east; for the strait can only be entered by the narrow passages which are to the north or south of this steep coral reef, and the whole space which lies to the west of the reef is dotted by islands, shoals, rocks, and reefs of various but not great extent. Between them are the narrow winding passages by which the vessels pass through the strait. The navigation is thus beset with many dangers. The strait can only be navigated between March and September, during the south-east monsoon: in the other six months of the year, or during the period of the north-west monsoon, the fogs prevail in the strait to such an extent, that no vessel can venture to enter among its almost innumerable reefs and rocks. Two different routes are taken by vessels in sailing to Torres Strait, and in passing through it. They are distinguished as the Inner and Outer route. The Inner route lies along the coast of Australia, and between it and the Great Barrier Reefs. The Outer route, which lies through the Corallian Sea, is dangerous, owing to the great number of reefs dispersed over it north of the southern tropic.

The route by Torres Strait is one of those which are now (1850) under discussion, in respect to establishing a steam mail communication between England and the Australian colonies.

TORRES VEDRAS. [ESTREMADURA, *Portuguese*.]

TORRICELLI, EVANGELISTA, was born Oct. 15, 1608, at Piancaldoli in Romagna. At this place, and in a school of the Jesuits, he received a mathematical education.

At twenty years of age his uncle sent him to Rome. The Dialogues of Galileo appear to have particularly engaged his attention, and he composed two tracts, one on the subject of mechanics, and the other on the motion of fluids, which were published with the rest of his mathematical works in 1643. Torricelli seems to have been the first who established the principle, that when two weights are so connected together that being placed in any position their common centre of gravity neither ascends nor descends, those weights are in equilibrio; and on this principle he investigated the ratio between two weights when they are in equilibrio on a double inclined plane. He also investigated the motions of falling bodies and projectiles; and the law of the motion of fluids issuing from an orifice.

Galileo, having received copies of the tracts above mentioned, was desirous of becoming acquainted with the author, and he pressed the latter to join him at Florence. Torricelli accepted the invitation: he was kindly received by Galileo, and it is said that his society and conversation contributed to soothe the last days of the venerable philosopher, who died at the end of three months from his arrival. Having been honoured by the grand-duke with the appointment of professor of mathematics in the Accademia, Torricelli became the successor of Galileo in the institution, and he resided at Florence till his death, which happened in 1647, when he was thirty-nine years of age.

The discovery which has immortalised the name of Torricelli is that of the barometer. He filled with mercury a glass tube which at one end was hermetically closed, and having inverted it, he brought its open extremity under the surface of mercury in a vessel; when he observed that the top of the column descended till it stood at a

height equal to between 29 and 30 inches (English) above the level of the mercury in the vessel, leaving what is considered as a perfect vacuum between the upper extremity of the column and that of the tube. The specific gravity of mercury being known, the weight of the supported column could, of course, be found.

By this experiment the opinion that a vacuum was contrary to a law of nature was immediately proved to be unfounded; but it is uncertain whether or not Torricelli was aware of the true cause of the column of mercury being so supported, and the honour of having been the first to prove decisively that it was the pressure of the atmosphere on the surface of the mercury in the vessel, is ascribed to Pascal.

TORRIDGE. [Devonshire.]

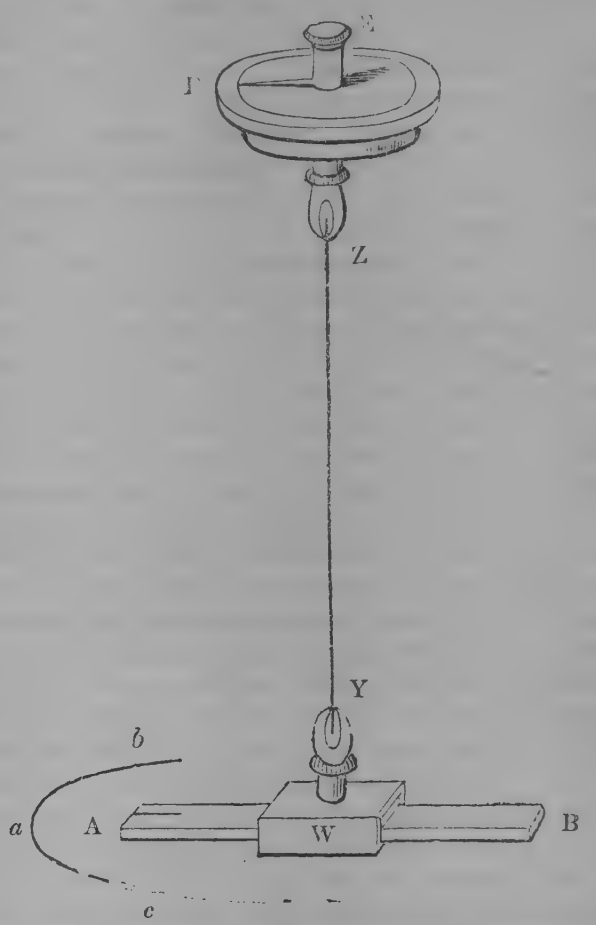
TORRIGIA'NO, PIE'TRO, a native of Florence, was born probably about the same year as Michel Angelo (1474), as they studied together from the antiquities in the gardens of Lorenzo de' Medici; a circumstance which Michel had good cause to remember, for such was Torrigiano's jealousy towards him, that he one day assaulted him, and inflicted so severe a blow upon his nose as to crush and disfigure it for ever. Being obliged to flee from Florence in consequence of this affair, Torrigiano went to Rome, where he was employed by Pope Alexander VI., and afterwards enlisted and served as a soldier, first under the Duke Valentino, next under Vitelli and Piero de' Medici. But though he distinguished himself by his prowess, he saw no chance of speedily advancing beyond his rank of ensign, and therefore returned to his former profession, and executed several small bronze figures, for some Florentine merchants, whom he afterwards accompanied to England. His talents, and perhaps his personal qualities also, recommended him to the favour of Henry VIII., for whom he executed a variety of things, but his chief work was the tomb of Henry VII. in Westminster Abbey, which he completed in 1519, and for which he received the sum of 1000*l*. The tomb of Margaret, countess of Richmond, in Henry VIIth's chapel, is also supposed to have been by him. There is a bust in wood of Henry VII., ascribed to him.

After finally quitting England in 1549, Torrigiano visited Spain, where he executed several pieces of sculpture for convents, &c., and among others a Virgin and Child, so beautiful that the Duke d'Arcos commissioned him to make a copy of it. But so great was his indignation at being paid no more than thirty ducats for this work, that he broke the statue to pieces. On this the Duke caused him to be imprisoned by the Inquisition as a heretic who had impiously destroyed a figure of the Holy Virgin. He was accordingly condemned by that tribunal, but he avoided the execution of his sentence by starving himself to death (1522).

TORRINGTON. [Devonshire.]

TORSION is that force with which a thread or wire returns to a state of rest when it has been twisted by being turned round on its axis: the thread or wire, which is suspended vertically, is attached at the upper extremity to some object, and at the lower extremity is a weight with a horizontal index, or a stirrup, which is to carry a needle or bar in a horizontal position.

Let Z Y be the wire, W the weight or stirrup, and A B an index or needle, and let *b a c* be part



of a graduated ring on the same level as the needle; then, on turning the object W round till a mark on the extremity A of the index is brought to any point, *b*, on the ring, the wire becomes twisted; and when the power by which W is turned is removed, the elasticity of the wire causes the point at A to oscillate within the ring through an arc, as *b a c*, which continually diminishes till the index rests in its original position.

Theoretical investigations have proved that, while the force of torsion is moderate, its intensity is directly porportional to the angle or arc through which the extremity A of the index is moved in twisting the wire, and that the time of a complete oscillation is constant, or that the vibrations are isochronous, like those of a pendulum which is acted upon by gravity. They further prove that the time of a vibration varies with the square root of the length of the wire; and that when a body, as W, is suspended, the squares of the times of vibration vary directly as the momentum of the body's inertia, and inversely as the force of torsion: consequently when the forms and weights of suspended bodies are the same, the force of torsion varies inversely with the square of the time.

These deductions from theory are confirmed by their agreement with the results of the numerous experiments made by M. Coulomb with an apparatus similar to that which is above represented; the times in which a certain number of isochronous vibrations were made with wires of different lengths, and carrying at their lower extremities cylinders of different weights, being observed.

By comparisons also of experiments on wires of the same length and of different diameters, consequently of different weights, Coulomb found that the times of vibration were inversely proportional to the weights, or to the squares of the diameters of the wires; and since the force of torsion varies inversely with the squares of the times, it follows that when the wires are of the like material and of equal lengths, the force of torsion varies directly with the fourth power of the diameter.

The torsion of slender wires was first employed by Coulomb for the purpose of determining the intensities of forces in nature and the laws of their action in circumstances which render direct methods inapplicable. In the article ELECTROMETER there is given a description of the instrument invented for the purpose by this philosopher, and of the method of employing it in finding the laws of electric attractions and repulsions. In order to discover the law of magnetic action with respect to the distances between the attracting or repelling bodies, Coulomb placed a magnetised needle in the stirrup of the balance, and after twisting the wire by turning the micrometer stem on its axis through a certain number of degrees, he observed where the needle rested between the opposing forces of torsion and the horizontal component of terrestrial magnetism. From several experiments of this nature he found that the forces of magnetic repulsion and attraction vary inversely as the squares of the distances.

The Bifilar Magnetometer, which was invented by M. Gauss, is a species of torsion balance: it is described at length in Taylor's 'Scientific Memoirs,' vol. ii., part 6.

TORTENSON. [THIRTY YEARS' WAR.]

TORTOISE-SHELL is procured from a marine tortoise called the Hawk's-Bill Turtle, or *Testudo imbricata*. Each animal furnishes thirteen principal plates, five along the centre of the back, and four on each side; and twenty-five smaller scales or plates, which constitute the margin of the shell. The horny plates which constitute true tortoise-shell are separated from the bony foundation which forms the shell or covering of the animal by the application of heat; the whole shell being commonly placed over a fire until the plates begin to start from the bone, and the separation being completed by the aid of a slender knife. The yellow-coloured shell bears a higher price than that which is mottled.

The processes of manufacturing articles of tortoise-shell are very similar to those described under HORN; but on account of the high price of the material (often three guineas per lb.), it is economised as much as possible. In making the frames for eye-glasses, narrow strips of shell are used, in which slits are cut with a saw, the slits being subsequently, while the shell is warm, strained or pulled open, until they form circular or oval apertures, by the insertion of tapering triblets of the required shape. The same yielding or flexible property is made use of in the manufacture of boxes, a round flat disc of shell being gradually forced by means of moulds into the form of a circular box with upright sides. The union of two or more pieces of shell may be effected by carefully scraping the parts that are to overlap, so as to render them perfectly free from grease, even such as might arise from being touched by the finger, softening them in hot water, pressing them together with hot flat tongs, and then plunging the joint into cold water.

In veneering with tortoise-shell, by which very beautiful work may be produced, it is usual to apply fish-glue, mixed with lamp-black, vermilion, green, chrome, white, or other colouring matter, at the back of the shell, both to heighten its effect and to conceal the glue or cement by which it is secured to the wooden foundation.

TORTOISES (*Testudinata* or *Chelonians*, from the Greek χελώνη), a numerous and interesting order of reptiles, comprised by Linnæus within the limits of a single genus, to which he applied the title of *Testudo*. [REPTILES.]

The tortoises, looking at them collectively, are all more or less completely boxed up in an external development of the skeleton, or of certain parts of the skeleton, which form a back and breast plate (*carapace* and *plastron*), covered either by horny plates or by a coriaceous membrane. In solidity, extent, and form, this panoply of defence presents numerous modifications, being the most developed and solid in the species which are purely terrestrial in their habits, and which from the slowness of their movements need such a security.

The dorsal buckler, or carapace, is formed by a singular expansive development of eight pairs of ribs, united down the middle by a longitudinal succession of angular plates, which may be justly regarded as offsets from the dorsal portion of the vertebral column. This portion of the skeleton is therefore thrown externally so as to form a shield more or less convex, more or less extensive. But besides these portions which are connected together by sutures, as in the bones of the human skull, there is a marginal set of bones which unite the sides of the carapace to those of the plastron; these costo-sternal plates are regarded by some zoologists as representing the sternal ribs of the Crocodile and other lizards.

The abdominal buckler, *sternum* or *plastron*, consists of nine osseous portions, of which eight are in pairs; the ninth is single, and occupies the anterior portion of the plastron, between the first four pairs, sometimes being articulated only to the primary pair, sometimes to the next in succession also. These nine pieces vary exceedingly in figure according to the genera and species.

Within this box, more or less complete, are contained the viscera, and other portions of the osseous system, as the bones of the shoulder, the pelvis, &c.

As it is in Tortoises of terrestrial habits that the plastron presents the greatest solidity, so it is in these animals that it presents some of the most remarkable differential characteristics. Its union to the carapace is by an extensive lateral surface; and at this line of union it is sometimes slightly moveable, but is mostly fixed by an unyielding suture. Its anterior and posterior margins are generally indented or notched for the more free egress of the neck and the tail. Sometimes how-

ever they are simply truncate, or, on the contrary, prolonged into a point. In one genus (*Pyxis*) the plastron is furnished with a transverse hinge, giving mobility to the anterior portion, so that the animals can retract their head and fore-limbs within the carapace, and close the plastron upon it, so as to shut them in. There is however another genus (*Kinixys*) in which the carapace, instead of being one solid whole, has the posterior portion distinct from the anterior, and moveable, so as to close upon the hinder margin of the plastron, and shut in the hinder limbs and tail. In the Marsh Tortoises, which resemble the terrestrial tortoises in the general construction and union of the plastron, there are genera which have this abdominal shield also furnished with transverse hinges. In the genus *Cinosternon* the plastron has two moveable valves, one anterior, one posterior, hinged on an intermediate fixed piece, so that the animal can shut itself completely in. In the genus *Cistudo*, there is only one hinge dividing the plastron into two moveable parts. In the genus *Sternotherus* the anterior part only of the plastron is moveable.

In the Matamata (*Chelys matamata*) the plastron is narrow, elongated, and firmly consolidated to the costal plastes of the carapace. In the *Emysaurus serpentinus* the plastron does not form a complete covering to the abdomen; it is narrow, and terminates anteriorly in a point which is enveloped in the skin, but its middle portion extends to meet on each side the edge of the carapace. In the River Tortoises, as the Trionyx (*Gymnopus*, Bibr.), the osseous part of the plastron is imperfectly developed, and is bordered all round by a tough leathery skin, which unites it to a similar skin bordering the imperfect carapace. In Marine Tortoises or Turtles the plastron is united to the edges of the carapace by intervening cartilage and not by suture.

The surface of the skull is continuous, without any moveable articulations as is the case with the serpents; and moreover the nasal bones are altogether absent. In the recent animal the external nostrils are narrowed by cartilaginous laminæ, which represent these bones; but in the skeleton is found, immediately at their upper border, the anterior frontal bone, which takes its ordinary place in the frame of the orbit, is articulated also, as ordinarily, to the ante-orbital apophysis of the maxillary bone, descends within the orbit, forms the anterior septum, which separates the orbit from the nose, and is articulated below with the palatine and the vomer, leaving between it, the maxillary, and the palatine an oblong hole, which leads into the posterior nostrils.

The jaws of tortoises are not armed with teeth, but are cased in horny coverings, often resembling the sharp hooked beak of a parrot, by means of which they crop and mince the vegetable aliment on which they feed. All however are not herbivorous, and hence arises considerable modification. In some species, as the *Trionyx* for instance, around the outside of this beak are thick fleshy lips; the food consists of small living animals, as amphibia, young birds, reptiles, &c. In the *Matamata*, the jaws of which open very wide, these parts instead of being armed with a strong beak, are protected by a sheath of horn, so delicate, that most naturalists have overlooked it.

In the Terrestrial Tortoises the feet are stump-like, the toes being so enveloped in the skin that their independent mobility is very limited. These animals are slow and laborious in their progressive movements: they do not put the whole sole to the ground, but only the edge of the sole, furnished with horny laminæ, tubercles, or hoof-like nails, which indicate the situation of the ultimate joint of each of the toes. In the Marine Tortoises, or Turtles, we find the limbs converted into broad flat undivided paddles or oars, admirably adapted for subaquatic progression, but awkward as instruments of locomotion, even on the low level shores to which these animals resort at the breeding season.

Between the Land Tortoises and the Turtles, certain forms adapted for lakes and rivers intervene, and in these we find the feet palmated, the toes which are elongated being united to each other by means of an intervening web.

All the Testudinata respire air. The lungs are of great extent, and placed in the same cavity with the abdominal viscera. The thorax, in most of them, is immoveable, and the fixed ribs can give no assistance in respiration in the full-grown normal forms. It is therefore by the play of the parts about the mouth that the Testudinata respire, and here the complicated os hyoïdes is called into prominent action. The jaws are closed, and the animal alternately elevates and depresses the os hyoïdes; the first movement lets the air enter by the nostrils, and the tongue then closing their interior aperture, the second movement compels the air to penetrate into the lungs. In short the Testudinata swallow or gulp down the air necessary for their respiration like the Frogs.

The tongue of the Tortoises is fleshy, like that of the Parrots, and its nervous papillæ are very distinct. The œsophagus is short, and in the *Chelonians* is furnished internally with a number of close-set cartilaginous points, directed, so as to prevent the regurgitation of the food, towards the stomach, which has a transverse position. The intestines are long; the cloaca is situated beneath the tail, and rounded, and, internally, is found the orifice of canals which terminate in the cavity of the peritoneum. The liver is voluminous, forming two masses or lobes placed transversely below the heart, and in front of the junction of the œsophagus with the stomach. The pancreas is a very large gland, and the spleen is rounded, median, and situated at a considerable distance from the liver. The chyle is translucid and aqueous in the *Chelonians*, but of a white and milky tint in those species which feed on animals.

The food with which the Testudinata have to deal is various, and there are modifications in the digestive organs accordingly. The *Chelones* and *Testudines* generally prefer a vegetable diet. The *Trionyces* and *Chelydes* prey upon fishes and small aquatic birds; and the *Emydes* attack the weaker animals, such as crustaceans, insects, worms, and mollusks.

These aliments are submitted in the Terrestrial Tortoises and in the *Chelonians* to the trenchant horny bill, well fitted to mince up vegetable fibre, assisted by the tongue, which draws the food into the mouth and the horny grooves and hollows of the jaws; the *Trionyces* and *Emydes* seize their living prey in their sharp-edged beaks, and tear it to pieces with the cutting and pointed claws of their fore-feet: some of these dart out their head and long neck upon their prey from an ambush; or, stealing along like the cats, till they come within reach, suddenly extend their destructive apparatus with unerring aim. The *Chelydes*, whose fleshy jaws are flat, swallow their prey whole, and in this respect, as well as in the general conformation of the head and the os hyoïdes, they resemble the Toads and especially the Pipas, like which they are obliged to be content with a victim of small dimensions suited to the calibre of their mouth, which is in truth sufficiently large. They are said never to seize their prey till they are satisfied by its motions that it is alive, for they never feed on carcasses.

With regard to the senses of these reptiles, we may observe that the brain is but little developed; indeed in the marine species the mass of the encephalon does not entirely fill the cavity of the skull. With this condition of the brain are conjoined great muscular irritability, and extreme tenacity of life.

Redi, in the beginning of November, made a large opening in the skull of a Land Tortoise, extracted the brain and cleaned out the cavity. He then set the animal at liberty, and it groped its way freely about wherever it pleased, as if it had not been injured. Redi makes use of the term groping (brancolando), because he says that when the tortoise was deprived of its brain, it closed its eyes which it never again opened. The wound which was left open skinned over in three days, and the tortoise, continuing to go about and execute other movements, lived to the middle of May. On a post mortem examination the cavity which the brain had occupied was found empty and clean, with the exception of a small, dry, and black clot of blood. He repeated this experiment upon many other Land Tortoises in the months of November, January, February, and March, with this difference, that some were locomotive at their pleasure, whilst others, though they made other motions, did not move about: he found the same results when he treated Freshwater Tortoises in the same manner, but they did not live so long as the terrestrial species. He states his belief that the Marine Tortoises would live a long time without their brain, for he received a turtle which he treated in the same way, and though it was much spent and faint from having been long out of the sea, it lived six days. In November he deprived a large tortoise of its head, without which it continued to live twenty-three days: it did not move about as those did whose brain had been taken out, but when its fore or hind legs were pricked or poked, it drew them up with great strength, and executed many other movements. To assure himself beyond all doubt that life, such as it was, continued in such cases, he cut off the heads of four other tortoises, and on opening two, twelve days afterwards, he saw the heart beat and the blood enter and leave it.

The sense of touch properly so called is very limited. It seems to reside more about the snout and head than in the limbs or feet; nevertheless we have seen tortoises press their vegetable food beneath their feet, by way of fixing it firm, while they bit or tore off portions, in the act of satisfying their hunger.

The wide fleshy tongue, with its distinct papillæ, seems well calculated for the reception of flavour from animal or vegetable juices, during the process of mincing the food by the mandibles. But most probably in those species, as the *Matamata*, which gulp their prey, this sense is far less developed than in the vegetable-feeders.

No doubt this sense is sufficiently acute for the assistance of these reptiles in their selection of food, and is perhaps most discriminative in those species which live on vegetable aliment. Its delicacy however cannot, we should suppose, be very refined.

The sense of hearing, both as anatomy and observation seem to indicate, is tolerably quick in these animals; it may not be very nice, but it is sufficient to give warning of danger, or of the approach of creatures which form the prey of the carnivorous species.

The eye in the Testudinata is well developed, and is large; moreover it is modified so as to be adapted to the medium, whether of air or water, through which the light is to be transmitted. In the substance of the cornea scales or osseous plates are found analogous to those of birds. There are three eyelids and two lachrymal glands.

Distribution, and General Remarks. — The warmer regions of Europe and Asia, Africa and Australasia. None indigenous in our island. The land species appear generally, if not altogether, to hybernate, or, in hot latitudes, to æstivate, that is to retire underground, and there take their siesta during the dry season, until the revivifying showers reanimate dormant nature, whether animal or vegetable. All are oviparous, burying their eggs, which are hatched by the warmth of the sun. The terrestrial species are slow in their movements, but the aquatic species swim with great facility, some even with rapidity on or below the surface of the water. The actions of the marine tortoises below the water resemble those of birds in the air—the paddles flapping, so to speak, like aquatic wings. The heart of the Testudinata consists of two auricles and one ventricle, with two unequal chambers, which communicate together, insomuch that the aortic system is filled with mixed blood, partly arterial and partly venous. Power of abstinence very great.

With regard to the arrangement of the groups composing the *Testudinata* we must refer to Cuvier ('Règne Animal'), to Mr. Bell ('Zool. Jour.,' vol. iii.), the Prince of Musignano ('Amphibia Europæa,' in 'Memorie della Reale Acad. delle Scienze de Torino,' serie ii. tom. ii), and MM. Duméril and Bibron's 'Erpétologie.'

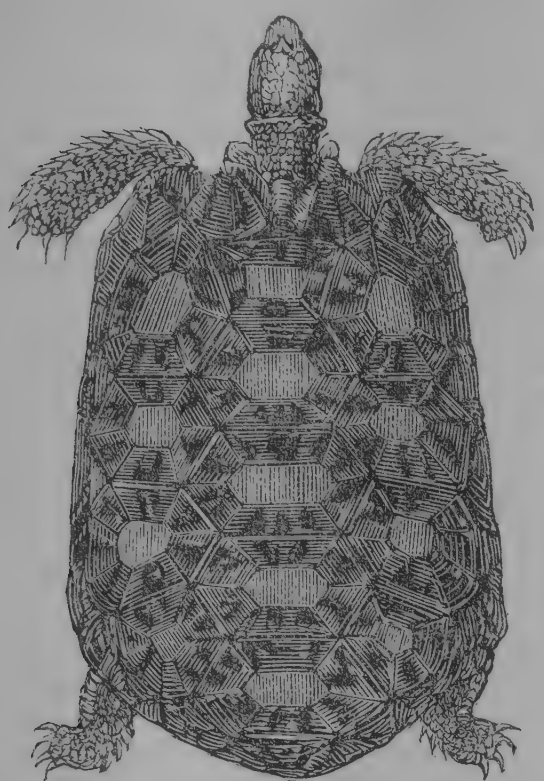
The latter zoologists divide the Tortoises into

the following groups:—1st. The *Chersites*, Chersians, or Land-Tortoises; 2nd, The *Elodites*, Elodians, or Marsh-Tortoises; 3rd, The *Potamites*, Potamians, or River-Tortoises; 4th, The *Thalassites*, Thalassians, Sea-Tortoises, or Turtles.

Family 1st, *Chersians*—Land-Tortoises.

Family Character.—Chelonians, with a very convex carapace; limbs short, equal; feet in the form of rounded callous stumps, with indistinct unguiculate toes.

Genus, *Testudo.*—Feet with five toes, hind-feet with four nails only; carapace of a single piece; sternum not moveable anteriorly.



Pyxis arachnoides, seen from above.

This genus is divided by MM. Duméril and Bibron into three sections, or subgenera:—

1. Those species which have the posterior portion of their plastron moveable: these correspond with the genera *Chersus*, of Wagler; *Testudo*, of authors: *Chersina*, of Gray.

2. Those species whose plastron is solid in all its parts, or of a single piece covered with twelve plates.

3. Those species which have the sternum equally immoveable, but covered with eleven horny plates.

These sections embrace twenty-two species.

For an interesting account of the habits of a tortoise in captivity, see White's 'Natural History of Selborne.' The habits and manners of a huge species inhabiting the Galapagos Archipelago (*Testudo Indica*, Auct. *T. nigra?* Quoy and Gaim.) are well described by Mr. Darwin, in the 'Voyages of the Adventure and Beagle.'

Family 2nd, *Elodians*—Marsh Tortoises.

Geographical Distribution of the Family.—MM. Duméril and Bibron observe that of the four families which compose the order Chelonians, that of the *Elodites* is the most numerous in genera, and above all in species. For Marsh Tortoises have been found in the Old World and in the New, and even in Australasia, where hitherto not one species of *Chersites* has been detected. America produces more species of *Elodians* than all the rest of the world put together; for, of the seventy-four species which compose that family, forty-six are exclusively American, and the remaining twenty-nine are divided between Australasia and the Old World.

Habits of the Elodians.—These differ very much from those of the other three great groups of Chelonians. The Marsh Tortoises have not the slowness of the Land Tortoises. They swim with facility, and on land make much quicker progress than the *Chersians*. They frequent small streams whose course is not too rapid, lakes, ponds, and marshes: they are not almost entirely vegetable feeders, like the *Chersians* and *Thalassians*, but, like the *Potamians*, prey on living animals: river-mollusks, Anurous and Urodele Batrachians, and Annelids are their food.

This family is divided into two tribes, viz. the *Cryptodera*, which have the neck folded back upon itself when retracted beneath the carapace, and *Pleurodera*, in which it is turned to one side. The principal genera of the Cryptodera are *Cistudo*, *Emys*, *Emysaurus*, *Staurotypus*, and *Kinosternon*.

To the *Pleurodera* belong the genera *Peltocephalus*, *Chelodina*, *Sternothœrus*, *Platomys*, *Chelys*, &c.

Family 3rd, *Potamians*, or River Tortoises.

The species belonging to this family live in the water, only coming out occasionally.

Geographical Distribution of the Potamians.—MM. Duméril and Bibron state that no species of this family have been observed in European rivers. All those which have been described, and whose country is known, come from the streams, rivers, or great fresh-water lakes of the warmer regions of the globe; from the Nile and the Niger in Africa; from the Euphrates and Ganges in Asia; and from the Mississippi and Ohio, or some of the rivers that flow into them, in America: but MM. Duméril and Bibron add that we are far from knowing all the species, for they have been a long time confounded under one name (*Trionyx*).

Habits, &c., of the Potamians.—It would seem that individuals of this family attain a large size. MM. Duméril and Bibron quote Pennant as mentioning some which weighed 70 lbs.; one which he kept three months weighed 20 lbs., and its buckler was 20 inches in length, not reckoning the neck, which measured 13½ inches. Their mode of life and habits seem to have great similarity. They swim with much ease both on the surface and at mid-water. The lower part of their body is generally pale white, rosy, or bluish; but their upper parts vary in their tints, which are most frequently brown or gray, with irregularly marbled, dotted, or ocellated spots. Straight or sinuous brown, black, or yellow lines are disposed symmetrically on the right and left, principally on the lateral parts of the neck and on the limbs. During the nights, and when they believe themselves to be secure from danger, the Potamians come to repose

on the islets, the rocks, the fallen trunks of trees upon the banks, or floating timber, whence they precipitate themselves into the water at the sight of man, or at the least alarming noise. They are very voracious and agile, and pursue, as they swim, reptiles, especially young crocodiles, and fishes. Their flesh being esteemed, they are angled for with a hook and line, baited with small fish or living animals, or with a dead bait, to which the angler gives motion and apparent life; for they are said never to approach a dead or immoveable prey. When they would seize their food or defend themselves, they dart out their head and long neck with the rapidity of an arrow. They bite sharp with their trenchant beak, and do not let go till they have taken out the piece seized on; so that their bite is much dreaded, and the fishermen generally cut off their heads as soon as they have caught them.

The males appear to be fewer in number than the females, or, at least, they come less frequently to the banks of the rivers, where the females resort to deposit their eggs in hollows, which contain from fifty to sixty. The number varies according to the age of the females, which are less fruitful in proportion to their youth. The eggs are spherical; their shell is solid, but membraneous or slightly calcareous.

Genera, *Gymnopus* and *Cryptopus*.

The *Gymnopus spiniferus* (*Trionyx ferox*) of the rivers of Georgia and Florida, is noted for its ferocity and great powers. The Nile, the Ganges, and the Tigris and Euphrates produce other species.

Family 4th, *Thalassians*, Sea Tortoises, or Turtles (*Cheloniadæ*, Gray).

This family is at once distinguished from all the others by the comparatively depressed carapace, and the long and broad paddles, the anterior of which are very much prolonged when compared with the posterior ones. Indeed, their limbs are entirely so modified as to become swimming organs.

Geographical Distribution of the Family.—The *Thalassians* are found in all the seas of warm climates, but principally towards the torrid zone in the equinoctial ocean, on the shores of the Antilles, Cuba, Jamaica, the Caiman Isles, and St. Domingo; in the Atlantic Ocean, at the Cape de Verd and Ascension Islands; in the Indian Ocean, at the Isles of France, Madagascar, Seychelles, and Rodriguez; at Vera Cruz in the Gulf of Mexico; and at the Sandwich and Galapagos Islands in the Pacific Ocean.

Habits of the Thalassians.—The Turtles hardly ever leave the sea, excepting for the purpose of laying their eggs; but some accounts state that they will crawl up the shores of desert islands in the night, and clamber up the edges of isolated rocks far out at sea, for the purpose of browsing on certain favourite marine plants. They have been seen in smooth water, as far as seven or eight hundred leagues from the land, floating motionless on the surface of the sea, as if they were dead, and it has been supposed that they are then asleep. They dive well, and can remain beneath the surface a long time, as might be expected from the extent and volume of their arbitrary lungs, which

are capable of retaining and furnishing a sufficient quantity of air while they are submerged.

In order to reach the destined spot for the deposition of their eggs, the females have often to traverse the sea for more than fifty leagues, and the males accompany them to the sandy beaches of those desert islands selected for the places of nidification. Arrived at the end of their voyage, they timidly come forth from the sea after sunset; and as it is necessary to leave the eggs above high-water mark, they have often to drag themselves to a considerable distance before they can hollow out their nests (about two feet in diameter) during the night, and there lay at one sitting to the number of a hundred eggs. This laying is repeated thrice, at intervals of two or three weeks. The eggs vary in size, but are spherical, like tennis-balls; and when they are laid, their investing membrane is slightly flexible, although covered with a delicate calcareous layer. After slightly covering the nest with light sand, the parent returns to the sea, leaving the eggs to the fostering influence of a tropical sun. The eggs are said to be hatched from the fifteenth to the twenty-ninth day; and when the young turtles come out, their shells are not yet formed, and they are white as if blanched. They instinctively make for the sea; but on their road, and as they pause before entering the water, the birds of prey that have been watching for the moment of their appearance hasten to devour them; whilst those that have escaped their terrestrial persecutors by getting into the sea, have to encounter a host of voracious fishes and legions of ambushed crocodiles.

Those that escape attain, under favourable circumstances, enormous dimensions. Individuals of the genus *Sphargis* have been known to weigh 1500 to 1600 lbs.; and some *Chelones*, whose carapace has measured in its circumference more than 15 feet, and near 7 feet in length, have weighed down more than from 800 to 900 lbs. Aged turtles often carry about with them on their carapace a little world of parasites, such as *Flustra*, *Serpulæ*, *Balani*, and *Coronulæ*; whilst certain *Annelids* securely fix themselves at the origin or base of the limbs, where the motion of the turtle cannot displace them.

MM. Duméril and Bibron speak of the Potamians and Turtles as exceptions to the rest of the Testudinata, which, generally speaking, can produce no other sounds than hisses. The cries of the *Potamians* and of some *Chelones* have been noticed by observers, and especially those of the Coriaceous Turtle or *Sphargis*. Individuals of this last genus, when hampered in nets or grievously wounded, have been heard to utter loud roars.

The food of the *Thalassians* consists principally of marine plants; but it appears that some of them, especially those which exhale a musky odour, *Chelone caouana* for instance, feed also on crustaceans and many species of mollusks, the cuttles especially. Their jaws are robust, like the beaks of birds of prey; solidly articulated and worked with highly-developed muscles; and their horny beak, hooked above and below, is trenchant on the edges, and most frequently serrated, so as to assist in securing a slippery prey.

Utility to Man, Chase, &c.—Though many of the other Testudinata are highly useful to man, especially as articles of food, none are of such great utility as the *Thalassians*. The inhabitants of those countries where the turtles grow to a large size do not merely derive from them a supply of food, but they convert their carapaces into boats, into drinking-troughs for their domestic animals, and into baths for their children.

As an article of food the Green Turtles, *Tortues franches* of the French, are so highly prized, that they have become a considerable article of commerce. The fat of many species, when fresh, is used with success in lieu of butter and oil in cookery; and in those species which have a musky odour (*Chelones caouana* and *caretta* for instance), it is used for embrocations, leather-dressing, and lamp-oil.

The Imbricated Turtles furnish that beautiful article Tortoise-Shell, or rather the best sorts of it. The eggs of all the species, particularly those of the Green Turtles, are excellent food.

One of the most obvious methods of capture is to watch the females as they emerge from the sea to deposit their eggs, and then turn them upon their backs on the high and dry sand, where they helplessly remain till the captors come to fetch them on the morrow. When the turtles lie floating on the sea, either for the purposes of sleep or respiration, the turtle-fishers approach them quietly with a sharp harpoon, carrying a ring at the butt-end, to which a cord is attached. The harpooner strikes, and the wounded animal dives, but is at last secured by the cord. In the South Seas skilful divers watch them when so floating, and, getting under the animals, suddenly rise, and so seize them.

On the coasts of China and Mozambique, turtles are taken by means of the *Echeneis Remora*, or Sucking-Fish, which, secured by a long cord, is slipped overboard when in the vicinity of these animals floating at their ease in the water. As soon as the fish perceives one of them he makes towards it, and fixes so firmly upon it as to enable the fishermen to drag it to their boat and secure it.

Genus, *Chelone* (*Caretta*, Merr.). Examples, *Ch. midas*, the Green Turtle; *Ch. imbricata*, the Hawk's-Bill Turtle. Genus *Sphargis*. Example, *Sphargis coriacea* (*Testudo Lyra*), the Lyre Tortoise, or Coriaceous and Tuberculated Tortoise of Pennant.

Fossil Testudinata.

Fossil tortoises occur in various strata: as in the gypsum beds, under volcanic layers, in the lias, in beds of gravel and clay, in the London clay of Sheppy, and Harwich, &c.

TORTO'NA, a province of the Sardinian States, in the division of Alessandria, is bounded N. by the Po, which divides it from the province of Mortara, E. by the provinces of Voghera and Bobbio, S. by the Ligurian Apennines, which separate it from the duchy of Genoa; and W. by the province of Alessandria. The rivers Scrivia and Curone, both affluents of the Po, rise in the Ligurian Apennines, and cross the province from south to north. The area is 455 square miles, and the population in 1840 was 53,570.

The head town, *Tortona*, built upon an eminence near the Scrivia, gives title to a bishop, and has about 9000 inhabitants, several churches and convents, and a royal college. West of Tortona, in the direction of Alessandria, is the plain of *Marengo*, with the villages of Marengo and San Giuliano, where Bonaparte gained an important victory over the Austrians, in June, 1800. The territory of Tortona is very fertile, but the town looks dull and decayed. The other towns are,—*Castelnovo di Scrivia*, a town of 5500 inhabitants, N. of Tortona and near the confluence of the Scrivia and the Po: *Salé*, a town of 4000 inhabitants, near the confluence of the Bormida and the Po: *Fabbrica*, a town of 2000 inhabitants, in the Apennines, offsets of which spread over the whole southern part of the province.

TORTOSA. [Cataluña.]

TORTURE, in a legal sense, means the application of bodily pain in order to force discoveries from witnesses, or confessions from persons accused of crimes. Torture was applied to slaves at Athens. The Roman law allowed torture only in the case of slaves when examined either as witnesses or offenders.

In most German cities judicial torture was unknown until the end of the 14th century; although it appears in the statutes of the Italian municipalities at a much earlier period. Torture continued in many European states until the middle of the last century, when more enlightened views led to a general conviction of the inefficacy and injustice of this mode of ascertaining truth. In France the 'question préparatoire' was discontinued in 1780 by a decree, which is in Merlin's 'Répertoire,' vol. x., p. 502; and torture in general was abolished throughout the French dominions at the Revolution in 1789. In Russia its abolition, though recommended by the Empress Catherine in 1763, was not effected until 1801. In Austria, Prussia, and Saxony it was suspended soon after the middle of the last century; but although so seldom used as to be practically extinct, torture was allowed by the law of Bavaria, Hanover, and some of the smaller states of Germany, within the last 40 years. (Mittermaier's 'Deutsches Strafverfahren,' theil i., p. 396, note.) In Scotland, the use of torture prevailed until the reign of Queen Anne, when it was declared by the act for improving the union of the two kingdoms (7 Anne, c. 21, s. 5), that in future 'no person accused of any crime in Scotland shall be subject or liable to any torture.'

From the year 1468 at least until the Commonwealth, the practice of torture was frequent in England; particular instances are recorded in the council-books, and the torture-warrants in many cases are still in existence. The last instance on record occurred in 1640. But although the practice continued during the two centuries immediately before the Commonwealth, it was condemned as contrary to the law of England by judges and legal writers of the highest character who lived within that period. But that which was not lawful in the ordinary course of justice, was done under the prerogative of the crown, which authorised this mode of discovering crimes that affected the state, such as treason or sedition, and sometimes of

offences of a grave character not political,—acting in this respect independently of and even paramount to the common law ('Rolls of Parliament,' 20 Edw. I., A.D. 1292). This view of the subject is confirmed by the circumstance that in all instances of the application of torture in England, the warrants were issued immediately by the king, or by the privy council. The consequence was that in no country was torture so dangerous an instrument of power as in England. In other countries, where it was part of the system of trial, it was subject to rules and restrictions, fixed and determined by the law; but in England there were no rules, no law beyond the will of the king.

TORY. This name has now, for about 200 years, served to designate one of two principal political parties in this country. The name Tory, as well as the name Whig, and the existence of two parties in the state corresponding to those which have now been known for a long time as Whig and Tory parties, date from the reign of Charles II. and from the year 1679.

The first Tories opposed the Exclusion Bill, and supported Charles II. in his endeavour to prevent a renewal of the attack upon his brother, by successive prorogations of the parliament. The origin of the name is referred by Roger North, a very hot Tory, in a curious passage, to the connection of the party with the Duke of York and his popish allies. ('Examen,' p. 321.) The origin of the word Whig is a little younger than Tory.

Dr. Johnson gives an explanation of the word *Tory*, which is perhaps as good a short general description of the principles of Toryism as is to be given:—'One who adheres to the ancient constitution of the state, and the apostolical hierarchy of the Church of England.' Things as they have been, or, when some great change has taken place against the will of this party, things as they are,—the king before the aristocracy, and the aristocracy before the popular element in the constitution, which led the first Tories to argue from the divine right of kings for their exemption from parliamentary control, and for passive obedience, and which has afterwards directed their endeavours to contracting the suffrage so as to make the popular element as little popular as possible,—the freedom of the church from state control,—and the fullest possible amount of political privilege and honour for the church, as distinguished from every other religious denomination,—these have been the cardinal characteristics of Toryism, from the beginning to the present time.

TOTANUS. [SCOLOPACIDÆ.]

TOTNESS. [DEVONSHIRE.]

TOTT, FRANÇOIS, BARON DE, the son of an Hungarian nobleman, who had entered the French service, was born at Ferté-sous-Jouarre, Aug. 17, 1733. He obtained at an early age a commission in the hussar regiment of Berchiny, and on the death of his father, who had accompanied M. de Vergennes to Constantinople, he received an appointment in the embassy, 1757. He remained at Constantinople till 1763, when he returned to France.

In 1766 De Tott was appointed consul in the Crimea; but he contrived to involve himself so deeply in the intrigues of the court, that the vizir obtained his removal in 1769.

The Baron de Tott returned to Constantinople, entered the service of the Ottoman Porte, and continued in it till 1776. If his own account may be believed, he was during that period one of the moving spirits of the Ottoman Empire, especially in the improvement of its artillery and fortifications. It is evident that he did not think his services sufficiently appreciated, for in 1776 he tendered his resignation in disgust.

He was despatched by the French government in 1777 on a tour of inspection of the consular establishments in the ports of the Mediterranean from the Archipelago to the Barbary States. With this mission the diplomatic services of the Baron de Tott terminated. On his return to France he had two pensions settled upon him, and retiring from public life, occupied himself with his 'Mémoires sur les Turcs et Tartares,' which met with great success.

De Tott was raised to the rank of Maréchal-de Camp in 1781. In 1786 or 1787 he was appointed governor of Douai. He held that office till 1790, but opposing himself to the republican fervour of the garrison, was nearly murdered and obliged to fly. He took refuge in Switzerland, where he resided for a year, and then proceeded to Vienna. He died in obscurity at Tatzmandorf in Hungary, 1793.

TOTTENHAM. [MIDDLESEX.]

TOUCH. The sense of touch belongs to the outward integument of the body—the skin, and is shared, in a minor and modified degree, by parts of the mucous membranes, which, at the various orifices of the body, are continuous prolongations of the same structure. By it we have the faculty of determining our immediate relations to material objects, in regard of contact, temperature, and electrical excitement.

In order to that high development of the sense of touch, which we notice in the human hand, or in the proboscis of the elephant, certain anatomical peculiarities are required, viz.:—

1. An exposure of the largest possible number of points, each endowed with sensibility, and capable of being recognised in the sensorium, as distinct and individual. Such a structure is eminently illustrated in the papillary surface of the skin; which presents a vast number of minute evolutions, or papillæ, every one furnished with its own fibrillary nervous loop, and a minute inosculation of blood-vessels.

2. The sense of touch requires for its perfection that a muscular apparatus should be connected with the sentient surface, by means of which this may adapt itself to the superficies of bodies, in order to explore their outline, span their dimensions, or probe their texture. And we find accordingly in those organs which are most tactile—the hand, the tongue, the lips of the human subject, the snout, proboscis, or tentacles of lower animals,—that complicated muscular motions belong to the part, and render it a more available instrument of exploration. The importance of this addition becomes manifest, if we apply a foreign object to any plane surface of the body (to

the front of the fore-arm, for instance), and hold it there without pressure or motion. The only sensation so conveyed is one of indefinite contact: without pressure we know not its consistence; without successive and exploring movement we cannot ascertain its outline or level.

TOUCH-BOX. [ARMS.]

TOUL. [MEURTHE.]

TOULMIN, JOSHUA, D.D., was born in London, May 11, 1740, and was educated first at St. Paul's school, and afterwards at what was then called the Dissenting Academy. On being licensed to preach, he in the first instance settled as minister of a dissenting congregation at Colyton in Devonshire. At this time his opinions seem to have been what are commonly called orthodox; but he soon became a convert to the opinions of the Baptists; upon which, in 1765, he transferred himself to Taunton, where, besides having the charge of a Baptist congregation, he taught a school, and also, it is said, kept a bookseller's shop. He had not been long at Taunton before his theology underwent a further change; and in 1804 he accepted the situation of one of the pastors of the Unitarian congegation at Birmingham. This appointment he continued to hold till his death at Birmingham, July 23, 1815.

Dr. Toulmin received his diploma of D.D. from Harvard University, in the United States, in 1794. His first publication appears to have been an octavo volume entitled 'Sermons addressed to Youth, with a Translation of Isocrates's Oration to Demonicus,' which appeared in 1770. Among his subsequent works were—'Memoirs of Socinus,' 8vo., 1777; 'Letters to Dr. John Sturges on the Church Establishment,' 8vo., 1782; 'Dissertations on the Internal Evidences of Christianity,' 8vo., 1785; 'Essay on Baptism,' 8vo., 1786; besides a number of single sermons and other pamphlets.

TOULON, a large maritime town in the French department of Var, situated about 30 miles E.S.E. from Marseille, in 43° 7′ N. lat., 5° 55′ E. long., has tribunals of first instance, commerce, and marine, a custom-house, a school of hydrography, a school of naval medicine, a college, and 35,449 inhabitants. The town stands at the head of an inlet from the Mediterranean on a gentle slope at the foot of high hills, which enclose it on all sides except the south. The inlet is divided into two parts, the inner and the outer road by two headlands, which approach each other so as to form a strait. These roads are safe, well sheltered, and capable of receiving the largest vessels. On the north side of the inner road, and formed by strong moles, are two harbours, one for commerce, the other for the navy, which communicate with each other by a deep channel crossed by a swing bridge, and with the inner road by two narrow entrances passable by only one vessel at a time. The moles are hollow and bombproof, and formed externally into batteries on a level with the water. The commercial port, the more eastern of the two, was constructed by Henri IV., and is surrounded by handsome quays. The naval port was formed by Louis XIV., and is surrounded by quays, and on the town side by a naval arsenal, stores, forges, cannon foundries, armories, covered slips for building ships, various naval schools, and all the establishments and machinery necessary for the construction, rigging, and fitting-out of ships of war of all sizes. The ropewalk, built with cut stone, and covered with a vaulted roof, is 2000 feet in length. On the south-east and eastern moles of the naval port are the bagnio and hospital for convicts; in front of these are repairing docks. The artillery depôt is on the west side of the harbour, and contains an immense number of guns and projectiles. On the land side the town and harbour are defended by a strongly-bastioned wall and ditch, which, with a great number of detached forts and outworks, and an entrenched camp near the northern part of the walls, are now said to render the place impregnable.

Toulon is entered by two gates, that of Italy on the east, and that of France on the west; and is divided into the old and new quarters. The new quarter lies north of the Port Neuf or naval harbour, and contains all the splendid buildings connected with the dockyard; the Place d'Armes, a spacious and handsome square, bordered with rows of gigantic elm and plane trees; the Place St.-Roch, at the entrance of the town from the west; the theatre and the marine hospital, besides several straight, regular, and well-built streets. In connection with the naval hospital are schools of naval medicine and pharmacy, an observatory, and a museum of natural history. In the Place d'Armes is a large building forming the residence and offices of the maritime prefect. The old and larger part of the town lies opposite the commercial port; it is well built, and well paved, but, with very few exceptions, the streets are narrow and crooked, and the squares small. The handsome street fronting the harbour contains the town-hall, a handsome edifice, the balcony of which is supported by two fine caryatids sculptured by Puget. The Cours, which runs from the harbour past the former cathedral into the Rue-Lafayette, forms a long symmetrical promenade bordered with trees, under the shade of which, from early morning, are sold all kinds of garden stuff, flowers, fruits, and poultry. To the east of the Cours the streets are wide, straight, and regular. At the south-eastern angle of the town, new basins, wet docks, and yards for the construction of steam and sailing vessels, have been formed; this quarter is entered from the quay along the commercial harbour by a new gate.

The religious monuments of Toulon are—the former cathedral, now called Eglise Majeure, which has a handsome façade, and contains some good sculptures by Puget: the church of St.-Louis near the Place d'Armes, which presents a handsome portal and colonnade: and the churches of St.-Jean and St.-Pierre. Adjacent to the Eglise Majeure is a handsome building now occupied as a college. The land artillery depôt, which occupies one of the bastions on the north side of the town, the barracks, the hospitals, the public library, containing 8600 volumes, the court-house, and the vast fish market, the roof of which is supported by enormous pillars, are deserving of notice. The town is kept clean, and in summer

cool, by a great number of fountains, some of which are pretty. Outside the town on the north-west are the hospital de la Charité, and the botanical gardens; outside the gate of Italy is the exercising ground or Champ-de-Bataille, surrounded by a belt of elms and plane trees of great height. Of the forts, mention must be made of the Grosse-Tour, a gothic fortress with underground prisons, built under Louis XII. at the east side, and fort Aiguillette on the west side, of the strait connecting the two roads; of fort Faron, on the highest point above the town; and of fort La-Malgue on the east side of the entrance to the outer road, on which the French engineers have put forth all their skill in military fortification. The guns of these and the other forts sweep the harbours and the two roads from end to end.

The industrial products and commerce of Toulon, independent of its connection with the great naval establishments it contains, are not very important. Woollen cloth, hosiery, soap, candles, leather, and chocolate, are the chief manufactured articles; merchant ships are built. The commerce is composed of corn, flour, salt provision, wine, brandy, oil, capers, figs, raisins, and other fruits. There is an exchange, a savings bank, a mont-de-piété, and a lazaretto, which is at some distance from the town on the south side of the outer road. Steamers ply regularly between Toulon, Algiers, Corsica, and Italy.

Toulon existed as a harbour in Roman times, under the name of *Telo Martius;* it gave title to a bishop from the fourth century to the first revolution, when the see was suppressed. It was ravaged several times by the Saracens, and subsequently by pirates, to protect it from whom Louis XII. commenced the fortifications by laying the foundation of the Grosse-Tour, which was finished under François I. The constable Bourbon in the service of Charles V. took Toulon in 1536. Under Louis XIV. the town was fortified after the plan of Vauban. The Duke of Savoy, aided by a Dutch and English fleet, besieged it unsuccessfully by land and sea in 1707. On the 16th of August, 1793, the royalists of Toulon admitted from the English and Spanish fleets then cruising off the port a detachment of soldiers, who, subsequently reinforced and commanded by General O'Hara, held the town till Dec. 19 of the same year, when it was taken by the republican army, after a siege and bombardment by General Dugommier, under whom Napoleon Bonaparte directed the artillery.

TOULON-SUR-ARROUX. [Saone-et-Loire.]

TOULOUBRE. [Bouches-du-Rhône.]

TOULOUSE, the capital of the French department of Haute-Garonne, is situated on the line of the projected Bordeaux-Marseille Railroad, in the great plain of Languedoc, on the right bank of the Garonne, just above the point where that river is joined by the Canal du Midi, which sweeps round the city on the east and north, 136 miles S.E. from Bordeaux, 430 S. from Paris, in 43° 36′ N. lat., 1° 27′ E. long., and has 77,000 inhabitants. The large well-built suburb of St.-Cyprien, on the left bank of the river, is connected with the city by a handsome bridge, below which the natural navigation of the Garonne is interrupted by a dam thrown across it to form a mill-race. To remedy this, a canal cut by De Brienne, archbishop of Toulouse, leaves the river above the mill, and running for about 3-quarters of a mile, enters the Canal du Midi. The point of junction of the two canals is crossed by a bridge adorned with bas-reliefs (an allegorical respresentation of the meeting of the two seas, joined by the Canal du Midi), which forms the termination of a magnificent alley of trees running along the two canals. A short way below this junction, the Canal du Midi enters the Garonne through a basin provided with double locks. The old fortifications of Toulouse are fast disappearing, to make way for modern improvements. The interior of the city, which is entered by 9 gates, does not answer the expectations raised by its imposing appearance from a distance. The greater number of the houses are high, built of red brick, in an old rambling style; the rest are constructed with planks, the spaces between which are stuffed with straw and mortar. The streets are narrow, crooked, ill-paved, and dirty; but some improvements have been recently effected. There are however a few handsome Places or squares, and several interesting structures. Among the former, and nearly in the middle of the city, is the Place du Capitole, a handsome unfinished square, consisting of three sides of regular buildings, and one of old structures; it is adorned with a fountain at each angle, is the chief market-place, and the point on which the main streets abut. The Place Lafayette presents a circle of uniform buildings, with a magnificent fountain in the centre; and a fine public walk, composed of three parallel alleys of trees, leads out of it to the Canal du Midi. The Place de la Trinité is also adorned with a handsome fountain. On the isle of Tounis, which is opposite the town and covered with buildings, are the ruins of the castle of Narbonnais, the residence of the old counts of Toulouse. Besides the promenades already mentioned, must be named the Cours Dillon, along the left bank of the Garonne; the magnificent avenue of the Porte Neuve; the Esplanade, the alleys of which radiate from a circular green ornamented with a jet-d'eau; the public gardens; and the botanical garden, the largest and finest in France, next to that of Paris.

Among the religious monuments, the cathedral of St.-Étienne, which consists of a nave built in the commencement of the 13th century, and a choir erected at the beginning of the 17th; the whole is remarkable for this, that the axis of the choir intersects the axis of the nave at right angles. The grand altar is built of Languedoc marble, in the Corinthian order. The great portal entrance of the nave, and a large rose window above it, are much admired. The church of St.-Sernin or St.-Saturnin, built about 1090, in the form of an elongated cross, and in the Roman style, is the oldest, most perfect, and most richly-decorated ecclesiastical structure in Toulouse. It is surmounted by a lofty tower and spire, and contains many curious bas-reliefs, sculptures, and carvings. In the aisle, behind the grand altar, which is surmounted by a baldaquin, and under which are several very ancient relic cases, there

are five apsidal chapels, also containing reliquaries, and under the choir there is a crypt. In the church of La-Daurade, which is the burial-place of Clemence Isaure, and which has a very handsome interior, the gold and silver flowers of the successful competitors in the Floral Games are blessed. The church of St.-Pierre is remarkable for its handsome dome, surmounted by a colossal statue in lead. The Cordeliers' church, a lofty brick building of the 14th century, was lately used as a hay-store; and that of the Jacobins, which is of vast size, and surmounted by a lofty brick tower, has been formed into a barrack and divided by floors, the ground-floor serving as a stable for the artillery horses.

The capitole, or town-hall, situated in the Place du Capitole, is a handsome modern building of the Ionic order, with an octastyle portico of red marble; it is 394 feet long, 130 high, and contains, besides the municipal buildings, a theatre. The hall, called Salle des Illustres, runs along the whole length of the first floor, and contains terra-cotta statues of the worthies of Toulouse placed in niches in the walls. In this hall are held the annual meetings of the society of the Floral Games. [Clemence Isaure.] The court of the Capitole witnessed the decapitation of the Duke de Montmorency, Oct. 30, 1632. Next to the Capitole, the finest modern building is the residence of the Prefect, formerly the archiepiscopal palace. The museum, established in the desecrated Augustinian church, contains a good collection of Pagan and Christian antiquities, casts from the antique, and a great number of paintings. Among the other structures of the city, several of the hotels, the court-house, which is the old parliament house of Toulouse with the exterior modernised, the observatory, the veterinary college, the abattoir, the mint, the public library, in which are 60,000 volumes, the school of artillery, the barracks, the arsenal, the powder-mill, the cannon-foundry in the former nunnery of Sainte-Claire, the hospitals of St.-Joseph and Hôtel-Dieu, together capable of receiving 2000 patients, the guard-house, the Basacle and Château corn-mills, the Calvinist chapel, and the synagogue, are the most remarkable. The bridge over the Garonne, which was opened in 1600, consists of 7 arches, the central one of 108 feet span; it is 26 yards wide, and 288 yards long; the culverts are pierced with round holes to facilitate the passage of the water in great floods; on the St.-Cyprien side, the bridge terminates in a gate in form of a triumphal arch. Of the public fountains, that in the Square de-la-Trinité is the finest. Three circular stone steps support a basin 16 feet in diameter, from the middle of which rises a triangular pedestal of white marble, with lions' heads in bronze let into the faces: on this pedestal stand three bronze sirens, leaning against a baluster of the same metal, and supporting a white marble cup of 7 feet diameter, from the centre of which, the water springs upwards to the height of 27 feet above the ground.

Toulouse is the seat of a High Court, which has jurisdiction over the departments of Haute-Garonne, Ariège, Tarn, and Tarn-et-Garonne; and of a University-Academy, with faculties of law, science, literature, and Calvinistic theology. Among its literary and scientific institutions are—an academy of science, inscriptions, and polite literature; an archeological society; a society of the fine arts; a secondary school of medicine; a veterinary college; a school of gunnery; the academy of the Floral Games, the institution of which dates from 1323; and a diocesan seminary. The city has tribunals of first instance and of commerce, a chamber of commerce, an exchange, and a mint. It is the head-quarters of the 10th Military Division. St.-Saturninus, the first bishop of Toulouse, suffered martyrdom in 250; the see did not attain to metropolitan rank till the 14th century; at the first French Revolution, the archbishopric was united to that of Narbonne. The archbishop resides in Toulouse; his see is co-extensive with the department of Haute-Garonne, and his suffragans are the bishops of Montauban, Pamiers, and Carcassone.

The industrial products of Toulouse are of great variety, including coarse woollen cloth, blankets, silk goods, gauze, starch, straw-hats, vermicelli, wax candles, musical strings, card and room paper, pottery, scythes, steel and hardware; it has a large porcelain manufactory, cotton yarn mills, dye-houses, several printing offices, brandy distilleries, copper and iron foundries, tan-yards, cannon foundry, powder-mill, and a tobacco factory. The city is the entrepôt for the irons of Ariège, and has considerable commerce with Spain, Bordeaux, and Marseille. The business done in wheat and flour is very important, causing a circulation of above half a million sterling annually; the commerce in wine and brandy too is very considerable; other articles of trade are colonial produce, oil, soap, salt geese, Spanish wool, broadcloath, hardware, and feathers. Three eight-day and two three-day fairs are held in the year.

Toulouse stands on the site of the ancient *Tolosa*, the capital of the Volcæ Testósages, a Celtic tribe. It was plundered of an enormous treasure in gold and silver by the Romans under Cæpio (B.C. 106); afterwards under Roman sway it was greatly embellished, and became famous as a place of learning. (Aulus Gellius, 'Noctes Atticæ,' iii., 9.) The city, on the downfall of the Empire, was subject to the Visigoths, who made it their capital: they were dispossessed by the Franks under Clovis in 508. On the formation of the kingdom of Aquitaine by Charlemagne, Toulouse was chosen to be its capital. In the middle ages the city was governed by counts of its own, and suffered terribly for favouring the Albigenses, from the sieges, plunderings, and massacres of Simon de Montfort, who was at last killed under the walls of the town. A hard-earned victory was gained here by the Duke of Wellington in command of the Allied army, over the French commanded by Marshal Soult, April 10, 1814. An obelisk on a hill, outside the town, marks the marshal's position during the engagement.

TOUP, JONATHAN, was born at St. Ives in Cornwall, in December, 1713, and was partly

educated at a grammar-school in that town. He was afterwards entered at Exeter College, Oxford, where he took his bachelor's degree, but his master of arts degree he took at Cambridge. Toup entered the church, and obtained successively the rectory of St. Martin's, Exeter, and a stall in Exeter cathedral. He died on the 19th of January, 1785.

Toup was an accurate scholar, and one of the best English critics in the middle of the last century. The work by which he is best known is his 'Emendations of Suidas;' the first volume of which was published in 1760. This was followed by two volumes more in 1764 and 1766, and by a fourth in 1775, under the title of 'Appendiculum Notarum in Suidam.' In 1767 Toup published his 'Epistola Critica ad Virum celeberrimum Gulielmum Episcopum Glocestriensem,' containing various corrections and explanations of many passages in the Greek authors. Toup was also a large contributor to the Oxford edition of Theócritus edited by Wharton, which was published in 1770. Toup's last work was an edition of Longínus, published at Oxford in 1778, and reprinted in 1789, which is still one of the best editions of Longinus.

TOUR-DE-BOUC. [BOUCHES-DU-RHÔNE.]

TOUR-DU-PIN. [ISE'RE.]

TOURCOING. [NORD.]

TOURMALIN, or *Schorl*, occurs in rhomboidal crystals, harder than glass. Some varieties are transparent, some opaque. The colours are white, black, red, green, yellow, and blue. Tourmalin occurs most commonly in primary rocks, especially in granite, gneiss, and mica slate. Its localities are too numerous to be stated. Silica and alumina are the chief constituents in all the varieties.

TOURN. [LEET.]

TOURNAMENT, or TOURNEY, is from the French *Tournoi*, formerly *Tournoiement*, for which the Latin writers of the middle ages use *torneamentum*, *turneimentum*, and other forms. Various etymologies have been proposed for the word; but there can be little doubt that tournoiement means merely a turning or wheeling about, from the French verb 'tourner,' to turn.

A tournament may be defined to have been a species of combat in which the parties engaged for the purpose of exercising and exhibiting their courage, prowess, and skill in arms. Like the other customs of chivalry, the tournament seems to have taken its rise after the establishment of the feudal system.

A detail of the forms and ceremonies connected with the tournament may be most conveniently learned from the many accounts of tournaments in Froissart and other old chroniclers, or even from such fictitious narratives as the Knight's tale of 'Palamon and Arcite,' in Chaucer (or Dryden's paraphrase of it), or that of the tournament at Ashby, in Scott's 'Ivanhoe.'

The distinction between a tournament and a joust, or just, is not very clear. Ducange makes the joust to be properly a single combat or duel, whereas in a tournament a considerable number of combatants were commonly engaged on each side. There was also the species of single combat termed a *pas d'armes*, or passage of arms. On this subject, besides the works quoted above, the reader may consult the 'Traité des Tournois, Joustes, Carrousels, et autres Spectacles publics' (par Claude François Menestrier), 4to., Lyon, 1669; and 'Mémoires sur l'ancienne Chevalerie, considérée comme un Etablissement politique et militaire,' par J. B. de la Curne de St. Palaye, 3 tom. 12mo., Paris, 1759–1781.

TOURNAY (*Doornik*), an important town in the Belgian province of Hainault, is situated on the Schelde, 60 miles by railway S.W. from Brussels, 12 E. from Lille, and has 25,000 inhabitants exclusive of the suburbs. St. Jerome mentions it, under the name of *Tornacus*, among the towns seized by the barbarians. It was for some time the capital of Clovis. Its history from 1513, when it was taken by Henry VIII., presents a succession of sieges, the most important of which was that of 1581, when, having revolted against Spain, it was taken by the Duke of Parma. The Schelde divides the town into two parts, the old town on the left bank and the new town on the right: the old town occupies the site of the ancient Tornacus: the new town is distinguished from the old by the neatness and tolerable straightness of its streets, by its well-built houses, and by its handsome quay, planted with trees, which forms the most frequented promenade of the city. The cathedral in the old town is a large and fine Gothic building consisting of a nave, transepts which end in semicircular apses, and a choir separated from the nave by a rich screen. It forms a conspicuous object from all sides with its five towers surmounted by spires. The interior of the church is adorned with the richest carving and sculpture. The church of St. Martin, the episcopal palace, the town-hall, the bell-tower, and the hospital for old clergymen, are among the other principal edifices. The town is strongly fortified, and is entered by seven gates: it has several suburbs. The manufactures of the town comprehend cotton-yarn, printed cottons, dimities and other cotton goods, Brussels carpets, hosiery, linen, swanskin, paper, hats, leather, earthenware, porcelain, oil, liqueurs, bronze, &c. There are dye-houses, lime-kilns, and several large flour-mills: considerable trade is carried on. There are a subordinate court of justice, and a commercial court, a chamber of commerce, an exchange, a theatre, a bank, an orphan-house, five hospitals, and several schools and churches. Tournay is a bishopric which dates from the fifth century.

TOURNEFORT, JOSEPH PITTON DE, a celebrated botanist, was born June 5, 1656, of a noble family at Aix, in Provence. His relations wished him to enter into holy orders, and his studies were directed accordingly; but the death of his father, in 1677, enabled him to follow his own inclination, and he went to the Alps to study botany. At Montpellier he found fresh stores of information; and he collected still richer from the Cévennes, the Pyrenees, and from Catalonia. Many dangers and hardships beset him in these excursions, but he thus became possessed of a large collection of plants, and had made numerous observations. Having repaired to Paris, he

found a protector in Fagon, curator of the Jardin du Roi. In 1683 he was appointed assistant professor with Fagon at the Jardin du Roi. In 1688 he was commissioned to travel through Spain and Portugal, and shortly after through Holland and England, in order to enrich the Jardin du Roi with the plants of those countries. Being made, in 1692, a member of the Académie des Sciences, he proved by his 'Elémens de Botanique,' which was published shortly afterwards, how well he deserved his various honours. The title of Doctor of Medicine was conferred upon him by the Faculty of Paris in 1698. He again left France in 1700, being sent by the king to the East to collect plants and make observations. He was preparing to go to Egypt, when the illness of his patron, Fagon, called him home, after ten years' wandering. He now spent the little spare time he had in arranging his collections and in drawing up different works. He died Nov. 28, 1708.

The system of Tournefort was an advance on those of Cesalpino, Morison, Hermann, Ray, and Rivinus, but has since been displaced by those of Jussieu, De Candolle, and others. Authors had previously only employed themselves in grouping plants into classes; the much more important determination of the genera was still almost entirely wanting. It is this subdivision of the subject which distinguishes his labours from all that had preceded him.

The following is a list of some of Tournefort's principal works:—'Elémens de Botanique, ou Méthode pour connaître les Plantes,' Paris, 1694, 3 vols. 8vo., with 451 plates. Of this work, he published, in 1700, a Latin version, entitled 'Institutiones Rei Herbariæ, ed. altera, Gallicâ longè auctior,' Paris, 3 vols. 4to., with 476 plates. 'Corollarium Institutionum Rei Herbariæ,' Paris, 1703, 4to., with 13 plates. 'Histoire des Plantes qui naissent aux Environs de Paris, avec leurs Usages dans la Médecine,' Paris, 1698, 12mo. 'Relation d'un Voyage du Levant.' The first volume of this work was printed at the Louvre before his death; the second was completed from his manuscripts; and both were published in 1717, 2 vols. 4to. 'Traité de la Matière Médicale,' 1717, 2 vols.

TOURNEFO'RTIA, a genus of plants of the natural family of *Boraginaceæ*, named after the botanist Tournefort. The species are about fifty in number, forming small shrubs or herbs, diffused through the West Indies, South America, Indian islands, and India.

TOURNIQUET is a peculiar kind of bandage applied to a limb for the purpose of arresting the current of blood through its main artery. It is employed for this purpose in several cases, but especially in amputations of parts of the limbs, where large arteries have to be suddenly cut across.

The tourniquet is now not so generally used as formerly. Many surgeons prefer to have the artery compressed during an amputation by an assistant; because the tourniquet is not free from the objection of compressing the veins as well as the artery, and is liable to accidents which cannot be instantly repaired.

TOURNON. [Arde'che; Lot-et-Garonne.]

TOURNUS. [Saone-et-Loire.]

TOURS. [Indre-et-Loire.]

TOUSSAINT LOUVERTURE was born at Breda, in the island of St. Domingo, in 1743. His father and mother were African slaves. The first employment of Toussaint-Breda (so called from the place of his birth) was to take care of the cattle on the estate. He gained the confidence of his master, and was appointed to exercise a kind of superintendence over the other negroes. In this position the Revolution of 1791 found him.

Toussaint, from 1791 till the appearance of the proclamation of February, 1794, which declared all slaves free, was alike conspicuous for his zeal in the cause of the Catholic religion and of royalty. He held at first the title of 'Médecin des Armées du Roi,' in the bands of Jean Français, but soon exchanged it for a military appointment, and became his aide-de-camp.

The emancipation of the slaves worked a change in his sentiments. Receiving an assurance from General Laveaux that he would be recognised as a general of brigade, he occupied the Spanish posts in his neighbourhood, and repaired to the camp of the French general. His defection was followed by the surrender of Marmalade and other strong places, and threw cofnusion into the Spanish ranks.

In 1795, in consequence of a conspiracy of three of the Mulatto generals, General Laveaux was arrested at Cape Town. Toussaint Louverture (the name he assumed about this time) assembled his negroes, and soon found himself, by the support of the partisans of France, at the head of ten thousand men; he then marched upon the capital, and released the General. Toussaint Louverture was now created a general of division, and became in fact the supreme arbiter of the fortunes of the colony. He reduced the whole of the northern part of the island to the dominion of France, with the exception of the Mole of St. Nicholas, of which the English retained possession.

The arrival of the commissioners sent by the French Directory to proclaim the constitution of the year 3, confirmed the credit of Toussaint. In April, 1796, he was appointed commander-in-chief of the armies of St. Domingo, and eventually the civil administration of the colony was confided to him, the commissioners, with the exception of Raymond, a mulatto, being, at his suggestion, all sent back to France. The Directory professed to be perfectly satisfied, and appointed a new commission, at the head of which was placed General Hédouville.

Although public civilities were exchanged between Toussaint and the General, the latter from the first manifested distrust and suspicion, Toussaint continuing meanwhile to act with perfect independence. At length Hédouville issued a proclamation denouncing the *émigrés*, and professing to regulate the political relations of whites and negroes. Toussaint immediately issued another proclamation declaring that there were no *émigrés* among the natives of the island; and that the negroes were in fact free, but that it was desirable they should continue during five years

to labour for their old masters, receiving one-fourth of the produce. An insurrection now broke out at Cape Town, which was suppressed by Toussaint; but the commissioner with all his adherents, to the number of 1500 men, took refuge on board three French frigates, and sailed for France.

Their departure was the signal for the breaking out of the animosity between the mulattoes and negroes into acts of open violence. One strong place after another was taken from the mulattoes by the negroes, until Rigaud was shut up in Cayes. This was towards the close of 1799, and Bonaparte had already assumed the reins of government in France. One of the first steps of the new ruler was to confirm Toussaint in his authority; and Rigaud, seeing himself abandoned even by his own partisans, embarked with a few of his retainers to seek an asylum in France.

Toussaint Louverture was now at the summit of his prosperity. He preserved great simplicity in his own person, but surrounded himself with a brilliant staff. In Jan., 1801, he conquered the Spanish part of St. Domingo. He presented to a central meeting of his partisans a scheme of a colonial constitution, by which he was appointed governor for life, authorised to name his successor, and to nominate to all offices under government. He quelled an insurrection of the negroes, and did not hesitate to punish with death his own nephew, who was at the head of it. Under his strict but just sway the agriculture and commerce of St. Domingo flourished.

Bonaparte in the meantime preserved an ominous silence towards all Toussaint's overtures of friendship, but at length matters reached a crisis. Bonaparte despatched a squadron of fifty-four sail to reduce St. Domingo, and Toussaint was proclaimed an outlaw, Feb. 17, 1802.

The negroes were defeated in all parts of the island. Toussaint continued nevertheless to defend himself, but at last the defection of Christophe and Dessalines obliged him to listen to terms. The sentence of outlawry pronounced against him was reversed. He was received with military honours on paying a visit to Le Clerc, and General Brunet took his advice on the imposition of taxes, and the selection of cantonments.

Brunet invited Toussaint to a conference midway between Sancy and Gonaives, June 10, 1802; and when the generals retired to hold a consultation the negro guard was disarmed, and their chief arrested. He was sent without delay to Paris, where, after ten months of rigorous imprisonment, he died April 27, 1803.

After the death of Toussaint Louverture, his family were confined at Brienne-en-Agen, where one of his sons died. The survivors were set at liberty after the restoration of the Bourbons.

TOWCESTER. [NORTHAMPTONSHIRE.]

TOWN, in its popular sense, is an assemblage of adjoining or nearly adjoining houses, to which a market is usually incident. In legal language 'town' corresponds with the Norman 'vill,' by which latter term it is frequently spoken of in order to distinguish it from the word town in its popular sense. A vill or town is a subdivision of a county, as a parish is part or subdivision of a diocese. The vill, the civil district, is usually co-extensive with the parish, the ecclesiastical district; and, primâ facie, every parish is a vill, and every vill a parish. Many towns, however, not only in the popular but in the legal sense of the term, contain several parishes; and many parishes, particularly in the north of England, where the parishes are exceedingly large, contain several vills, which vills are usually called tithings or townships. The test proposed by Lord Holt is, that a vill must have a constable, and that otherwise the place is only a hamlet, an assemblage of houses having no specific legal character. The Anglo-Saxon 'tun' terminates the names of a great number of places in England; and in the southern counties the farm enclosure in which the homestead stands is usually called the barton (barn-*town*), in Law Latin, *bertona*.

TOWNLEY MARBLES, the name of an assemblage of Greek and Roman sculpture which now forms a portion of the extensive Gallery of Antiquities in the British Museum. It received its appellation from Charles Townley, Esq., of Townley in Lancashire, who began forming this collection at Rome as early as 1768.

About 1772 he brought his acquisitions to London, and placed them in a house in Park Street, Westminster, where by gradual accessions his collection was advanced to its highest celebrity.

Mr. Townley died Jan. 3., 1805. After his decease, his executors decided to offer the marbles and terracottas only to the nation, and immediately to fulfil Mr. Townley's conditional view with respect to the British Museum. An Act was consequently passed for purchasing them, and the sum voted was 20,000*l*. An additional edifice was built at the Museum for their accommodation, and the collection was opened to public view in 1808.

TOWNS, HEALTH OF. On the 14th of May, 1838, the Poor Law Commissioners presented to Lord John Russell, then Secretary of State for Home Affairs, a Report relative to the prevalence of disease among the labouring classes in certain districts of the metropolis. The House of Lords having, on the 19th of August, 1839, presented an address to her Majesty requesting her to direct an inquiry to be made as to the extent of the causes of disease stated in those reports to prevail, the Poor Law Commissioners received a letter from Lord John Russell, in which he stated that her Majesty required them to make such inquiry, not only as to the metropolis, but as to other parts of England and Wales, and to prepare a report stating the results of such inquiry.

In 1840 the subject was investigated by a Committee of the House of Commons, the result of which was a Report 'on the Health of Large Towns and Populous Districts.' In July, 1842, the Report of the Poor Law Commissioners was presented to both Houses of Parliament, entitled a 'Report on the Sanitary Condition of the Labouring Population of Great Britain, with Appendices.' 'Local Reports on the Sanitary Condition of the Labouring Population of England,' were presented at the same time; and also 'Reports on the Sanitary Condition of the Labour-

ing Population of Scotland.' In 1843 'a Supplementary Report on the results of a Special Inquiry, into the practice of Interment in Towns,' was presented.

On the 9th of May, 1843, Commissioners were appointed by the Queen for the purpose of 'inquiring into the present state of large towns and populous districts in England and Wales, with reference to the causes of disease among the inhabitants, and into the best means of promoting and securing the public health, under the operation of the laws and regulations now in force, and the usages at present prevailing with regard to the drainage of lands, the erection, drainage, and ventilation of buildings, and the supply of water in such towns and districts, whether for purposes of health, or for the better protection of property from fire: and how far the public health and the condition of the poorer classes of the people of this realm, and the salubrity and safety of their dwellings, may be promoted by the amendment of such laws, regulations and usages.'

The First Report of the Commissioners was presented to both Houses of Parliament at the end of June, 1844. The Report is accompanied by 437 folio pages of evidence on which the Report is founded, an Appendix of Special Reports on the Sanitary Condition of several Towns; besides other information on the Supply and Filtration of Water, on the Obstacles to Improvement in the Structure of Buildings, on the Cleansing of Streets and Houses, and on the application of Refuse.

The Second Report of the Commissioners was presented to Parliament in February, 1845. It treats briefly of the Causes of Disease, and at considerable length of Remedial Measures.

These inquiries have proved that the districts inhabited by the labouring classes, and often by tradesmen, in large towns, in many small towns, and in several parts of the country, are in a very noxious state from want of drainage, want of cleanliness, imperfect ventilation, deficiency of water, and density of population; the consequences of which are, great frequency of sickness and excessive destruction of human life. Typhus fever, cholera, consumption, scrofulous and other chronic complaints, mostly arising from causes which might have been prevented, are found to exist to an extent which it is painful to contemplate. The causes of sickness are generally most numerous and most intense in the crowded districts, and the mortality is, with few exceptions, in proportion to the density of population.

Of fifty towns which were visited by direction of the Commissioners, only eight were found to be in a tolerable state as to drainage and cleansing; and as to the supply of water, the reports were still more unfavourable.

The annual average mortality in England was 2.207 per cent., or 1 in 45. In healthy districts it was 2 per cent., or 1 in 50. In the metropolis the deaths were 1 in 39; in Birmingham and Leeds 1 in 37; in Sheffield 1 in 33; in Bristol, 1 in 32; in Manchester, 1 in 30; in Liverpool, 1 in 29. In Brussels they have been found to be 1 in 24. The mortality was greater in Liverpool than in any other town in England. The gentry in Liverpool lived 35 years; the tradesmen 22; the working class 15. The average of the whole town was only 17 years. By extracting from the mortuary registers of the metropolis for 1834, the ages at death of the gentry, the tradesman, and the working classes, who died at the age of 15 and upwards, Mr. Guy ascertained that the gentry lived 59 years, the tradesmen 49, and the working classes 48. From a Report of the Registrar-General it appears that out of every million of inhabitants 27,000 die every year in the large towns, and only 19,300 in the rural districts.

The large towns have already begun to make improvements. The improved drainage in twenty streets of Manchester has been found to diminish the annual number of deaths by more than 20 in every 110.

The loss of life, and the pecuniary charges consequent upon it to individuals and the community, are not the only considerations to be attended to. Not only the sickness which precedes death, but the sickness which is cured, render the sufferers incapable of following their usual occupations, and oblige them and their families to seek relief from the parish, and from public and private charity. It has been shown that pecuniary saving would result from sanitary improvements to such an amount as to justify the interference of the legislature, if it were only from motives of public economy.

The power vested in courts-leet by ancient usage is resorted to in a few towns for the abatement of minor nuisances. Mr. Coulthart, in his report on the sanitary condition of Ashton-under-Lyne, gives a description of the various matters which have been taken cognizance of by the leet-juries at Ashton-under-Lyne with beneficial effect. In most places however the exercise of these powers has fallen into desuetude, even where the courts still continue to be held.

On the 31st of August, 1848, 'The Public Health Act' (11 & 12 Vict., c. 63) was passed, and is applicable to the whole of England and Wales, except the cities of London and Westminster, and certain metropolitan districts. It appoints a 'General Board of Health,' which, on the application of towns or districts, may cause surveys of the same to be made, and, with the consent of a specified portion of the ratepayers, issue orders for carrying the proposed improvements into effect, but these orders are only provisional, and require the ultimate sanction of parliament to render them valid. During 1850 three acts were passed confirming the provisional orders issued to 31 towns and places; and provisional orders have been issued to upwards of 80.

On the 14th of Aug., 1850, an act was passed, 13 & 14 Vict., c. 52, 'to make better provision for the interment of the dead in and near the Metropolis;' which gives powers to the Board of Health to forbid absolutely the interment of bodies in overcrowded burial places, to provide cemeteries at a distance from the town, and to make provisions for securing economy in conducting funerals.

TOWNSHIP. This term is sometimes used to denote the inhabitants of a town in their collective capacity. In legal signification it is a vill

forming part of a parish in cases where a parish has been divided for secular purposes into several villsor townships.

TOXICODENDRON. [Rhus.]

TO'XODON (τόξον, a bow; ὀδούς, a tooth—from the curvature of the teeth), Professor Owen's name for an extinct genus founded on *Toxodon Platensis*, a gigantic mammiferous animal, referrible to the order *Pachydermata*.

The remains of the *Toxodon* were discovered by Mr Darwin in Banda Oriental, on the banks of a small stream, exposed by the action of a flood: they consisted of the skull and some teeth. A perfect tooth was obtained from the banks of the Rio Tercero, at the distance of 180 miles from the spot on the banks of the Sarandis, where the skull was found, one of the sockets of which, however, it exactly fitted. The cranium equals that of the Hippopotamus in size, and is described by Prof. Owen in the 'Proceeds. Geol. Soc.,' 1837; and in 'Zoology of the Beagle,' 1838.

TO'XOTES, a genus of Acanthopterigious fishes of the family *Squamipennes*, the species of which are remarkable for having the power of spirting out drops of water even to a height of three or four feet with such accuracy of aim as to bring down the insects upon which they feed from the aquatic plants frequented by their prey.

TRACERY, a term used to denote that species of pattern-work which is formed or traced in the head of a gothic window by the mullions being made to diverge into arches, curves, and flowing lines, enriched with foliations. The term is also applied to ornamental design of the same character, whether for doors, panelling, or ceilings; the only difference being that in windows the pattern or tracery is perforated, and in other cases closed, that is, is a mere pattern carved on the surface of a solid part. In particular instances, where the tracery on parapets, battlements, turrets, spires, &c., is pierced, it is then named Open-Work.

TRACHE'LIDES, the fourth family of heteronomous Coleoptera, in Latreille's arrangement of insects. The head is more or less triangular or pedicled, and cannot be retracted. They have soft bodies, smooth flexible elytra, often short, and maxillæ which are not hooked. They mostly live on leaves and flowers. Many of them simulate death when seized. *Lagria, Pyrochroa, Mordella, Notoxus, Floria*, and *Meloe*, are types of tribes in this family.

TRACHELI'PODA (τράχηλος, *trachélos*, a neck; and πούς, *pous*, gen. *podos*, a foot), Lamarck's name for his third order of the class *Mollusca*, which he divides into two sections:—*Phytiphaga* or Plant-Eaters, and *Zoophaga*, or Flesh-Eaters. The former are either air-breathers, as *Helix Limnæa*, &c., or water-breathers, as the *Melanians, Peristomians*, and others. The *Zoophaga* are all water-breathers and marine, as the *Canalifera, Albata, Purpurifera*, &c.

TRACHEO'TOMY is the operation of cutting into the trachea. It is sometimes also called *Bronchotomy;* and a similar operation on the lower part of the larynx is named Laryngotomy.

Tracheotomy may be performed for several purposes; as, to form an aperture either for the admission of air into the lungs, when the larynx, fauces, or upper parts of the air-passages are obstructed, or for the extraction of foreign bodies from the adjacent parts of the air-passages, or for the facility of inflating the lungs in suspended animation. In the first view it may be necessary in many diseases; such as croup, acute laryngitis, œdema of the glottis, severe cases of quinsy, tumours, and other growths in the larynx or pressing on it; in all of which the aperture through the glottis is frequently closed, not merely by the swelling of the membranes around it, or the enlargement of the adjacent parts, but by the spasmodic and fixed contraction of the muscles whose office it is to approximate the vocal ligaments. The relief afforded by the operation is often instantaneous, and, for a time, complete; but its ultimate results are less certain, for though it may be sufficient to prevent the impending suffocation, it has no influence in arresting the original disease. On the contrary, the operation itself is not without danger; and that, both from the accidents that may occur in its performance, and from its subsequent effects: and therefore, although no general rule can be laid down, its performance should not be undertaken unadvisedly, nor in any cases in which it is not absolutely and almost immediately necessary for the preservation of life.

TRACHYTE, the name of a pyrogenous rock, extremely abundant among the products of modern volcanoes, and composing whole mountains in countries where igneous action is very slightly or not at all perceived. It is essentially a felspathic rock, and amongst other peculiarities often contains cracked crystals of felspar.

TRACHYTELLA, a genus of plants of the natural family of *Dilleniaceæ*. The genus belongs to the tribe *Delimaceæ*, of the above family. The known species are only two in number, natives of China and Cochin-China, climbing in habit, with racemes of white flowers. The leaves of *T. Actæa* have so very rough a surface, that they are employed in Canton for polishing both wood and metal.

TRACTION, in Mechanics, is the act of drawing a body along a plane, usually by the power of men, animals, or steam; as when a vessel is towed on the surface of water or a carriage moved upon a road. The power exerted in order to produce the effect is called the force of traction.

Numerous experiments have been made for the purpose of ascertaining the value of a force so exerted; and when men are employed to draw laden boats on canals, it is found that if the work be continued for several days successively, of eight hours each, the force of traction is equivalent to a weight of $31\frac{1}{9}$ lbs., moved at the rate of two feet per second, or $1\frac{1}{3}$ mile per hour (it being understood that such weight is imagined to be raised vertically by means of a rope passing over a pulley, and drawn in a horizontal direction). The force of traction exerted when, without moving from his place, a man pulls horizontally against a weight so suspended, is estimated at 70 lbs. Mr. Tredgold considers that a horse exerts a force of traction expressed by 125 lbs. raised at the rate of $3\frac{2}{3}$ feet per second, or $2\frac{1}{2}$ miles per hour. A man or a

horse can however double his power of traction for a few minutes without being injured by the exertion; and when the carriage is in motion, so that the friction on the ground is alone to be overcome, a horse can draw, during a short time, on a level road, a weight exceeding 1500 lbs.

If a wheel-carriage were situated on a level plane which opposed no resistance, it is evident that, whatever were the diameter of the wheels, the smallest conceivable power of traction applied to the axle would suffice to put the carriage in motion. But when a wheel in moving meets with an obstacle on the ground, that obstacle is pressed at the point of contact by a force acting in the direction of a line drawn to it from the centre of the wheel, and arising from that part of the weight which is supported by the wheel, together with the force of traction; therefore by the 'resolution of forces,' the ratio between the resistance which is to be overcome by the moving-power and the weight on the wheel will become less as the diameter of the wheel is increased.

Experiments have shown that when the angle of traction, as it is called, that is, the angle which the plane of the traces makes with the road on which the carriage is moving, is 15 or 16 degrees, a horse pulls with good effect; and the height of the points at which the traces are attached to a horse's collar being about 4 feet 6 inches from the ground, it follows that, in order to obtain this inclination, the lower extremities of the traces or shafts should be 2 feet 3 inches from the ground. In general however, in two-wheeled carriages, the height of these extremities is about 3 feet.

As an example of the force of traction exerted by steam, it may be stated that on a level line of railway, an engine with an 11-inch cylinder, and having an effective pressure of 50 lbs. per square inch in the boiler, drew 50 tons at the rate of 30 miles per hour, working 10 hours daily; and that the same engine, with an equal pressure in the boiler, drew 160 tons at the rate of 15½ miles per hour.

TRADE-WINDS is the term used by seamen to indicate the perpetual or constant winds, because they promote more than any other circumstance navigation and trade. These perpetual or trade-winds occur in all open seas on both sides of the equator, and to the distance of about 30° N. and S. of it. They were unknown to the ancients, and even to modern seamen up to the time of Columbus; but, subsequently to that epoch, European navigation extended rapidly in the Atlantic and Indian oceans, and the trade-winds became generally known. It does not however appear that any attempt to explain this phenomenon was made before the time of Galileo, and the opinion of this philosopher was generally adopted till 1686, when Halley's hypothesis was published in the 'Philosophical Transactions.'

The facts respecting the trade-winds, which had been collected by Halley, have not been materially increased in number since his time, but they have been more exactly determined. The trade-winds are met with on both sides of the equator. The mean boundary-line of the region in which they blow, and beyond which variable winds prevail, is about lat. 28° in the eastern parts of the Atlantic Ocean, but in the western parts this line is generally two or three degrees farther N. and S. To the N. of the equator they blow in the eastern parts of the ocean from the N.E., seldom from the eastward of E.N.E., or from the northward of N.N.E. In proceeding farther W. they become more easterly, and often they blow from due E., and sometimes from the S. of E., but generally they are one or two points N. of E. To the S. of the equator the trade-winds in the eastern parts of the ocean blow from S.E., and usually between S.E. and E., but they also decline more to due E. in reaching the western portion of the ocean. They do not occur in the vicinity of the continents, but are chiefly separated from them by a tract of sea in which either periodical or variable winds prevail. Though the trade-winds of the northern and southern hemisphere blow in an oblique direction towards one another, they do not meet in general, but are divided by a tract of sea in which calms frequently prevail, and also variable light winds, mostly from the W., are met with. This region of the calms is distinguished by a thick foggy air, and frequent rains of short duration attended by thunder and lightning. [ATLANTIC OCEAN.] The rarefaction produced in our atmosphere by the apparent diurnal progress of the sun is the origin of the trade-winds. It appears that the heat caused by the sun in the air is strong enough to produce this rarefaction to an extent of about 60° of latitude, as the trade-winds, including the region of calms, extend over nearly such a portion of the globe. In this immense space the rarefied air is replaced by the colder and denser air which rests over the region contiguous to the region of the trade-winds. If the wind could move with a degree of velocity equal to the progress of the sun, it would blow from the north on the north of the places under the influence of the perpendicular rays of the sun, and from the south on the southern side of such places. But the velocity of the wind is less than that of the earth. Hence it follows that the wind has hardly taken the direction which is imparted to it by the rarefaction of one place, when the place of the greatest rarefaction has already changed, having proceeded farther west. This makes the direction of the wind decline to the place of greater rarefaction, and thus the northern wind is converted into a north-eastern and the southern into a south-eastern wind. This process in the atmosphere rapidly extends westward when not interrupted by the intervention of high land, and hence it is found that in the western portions of the ocean and also near the equator the trade-winds blow nearly from due east.

The trade-winds, both in their direction and limits, incline towards the sun, or place of greatest rarefaction; that is, when the sun is near the northern tropic, or returning from it, having heated the northern hemisphere, the S.E. trade-wind declines farther from the E. point than in the opposite season, and blows with strength towards the place of greatest rarefaction; and its northern limits reach nearly to, and in some places beyond, the equator. The N.E. trade-wind

at the same time inclines nearer to the east point than in the other season, blowing with less strength, and becoming contracted in its southern limits, which then recede several degrees, sometimes 14 or 15 to the north of the equator. In the opposite season, when the southern hemisphere is greatly heated by the sun, the N.E. trade-wind blows stronger, declines farther from the east point, and approaches nearer the equator: the strength of the S.E. trade-wind at the same time is considerably diminished by the influence of the sun, and approaches some points nearer to the east point.

The calms between the two trade-winds are ascribed by Kämtz, in his 'Handbuch der Meteorologie,' to the greater rarefaction of the atmosphere in the regions where they prevail. This rarefied air rises above the more dense part of the atmosphere; and, by its quick ascent, diminishes the velocity of the wind blowing along the surface of the sea. When the rarefied air has arrived at a certain elevation above the surface of the globe, it is condensed by the cold, but being unable to return to its former place, which has been occupied by a colder air from another place, it flows towards the poles, or rather towards those parts which have supplied the air to the rarefied places. This expanse of the upper air takes a direction opposite to that of the trade-winds, namely, to the N.W., from which quarter the greater part of the air had been derived, which occupied its place within the trade-winds: thus two currents of air are found within the limits of the trade-winds, of which the lower runs to the S.W. north of the equator, and to the N.W. south of it, and the upper in the opposite direction.

With respect to the trade-winds in the Pacific Ocean, we find that in the southern parts they appear to be subject to great changes in direction and force, and that they properly occur only along the coasts of South America, where a constant S.E. wind is met with at the distance of 500 to 600 miles from the coast: but in the middle of the Southern Pacific the trade-wind seems by no means regular and constant. The irregularities in the trade-winds of the Southern Pacific are probably produced by the innumerable islands and coral rocks or banks in that ocean between the equator and the southern tropic, and which extend from 130° W. long. to the coast of Australia, the atmosphere over these banks being less rarefied by the increased evaporation than that over the deep water, and consequently not requiring so great a supply of air to restore the equilibrium as the circumjacent parts, which are more rarefied and heated. It appears that in the Southern Pacific the trade-winds are replaced by the north-eastern, northern, and western winds only during the period when the sun is in the southern hemisphere.

A south-eastern trade-wind prevails also in the Indian Ocean from within a few degrees of the eastern side of Madagascar nearly to the coasts of Australia, between the parallels of 10° and 28° S. lat.; but in this ocean from 10° S. lat. to the coast of Hindustan the winds are periodical. [Monsoons.]

TRADESCANT, JOHN, the name of two naturalists, father and son, who lived in England during the 17th century. John Tradescant, the elder, who appears to have been a Dutchman, was appointed gardener to Charles I. in 1629. He had previously travelled in the East. It is not known at what period he died. He left behind him a large collection of specimens of natural history, and a garden well-stored with rare and curious plants.

John Tradescant, the younger, inherited his father's taste for natural history. Early in life he made a voyage to Virginia, and brought from that country a collection of dried plants and seeds. In 1656 he published in 12mo., 'Museum Tradescantium,' or 'A Collection of Rarities preserved at South Lambeth near London.' It contains a descriptive catalogue of his father's museum. This museum was remarkable as containing one of the few specimens ever known of the Dodo. [Dodo.] Tradescant, who died in 1662, left his museum of natural history to Mr. Elias Ashmole. It was afterwards bequeathed by Ashmole to the university of Oxford, where it bears the name of the Ashmolean Museum.

TRADESCA'NTIA, a genus of plants of the natural family of *Commelinaceæ*, which was so named in honour of the English botanist John Tradescant, who was gardener to Charles I. The species are natives of America and of India. Many of them being of a highly ornamental nature, are cultivated in flower-gardens. *T. virginica*, a native of North America, is the species most common in the flower-borders of English gardens.

TRADITION (from the Latin *tradere*) comprises, in the widest sense of the word, all that has been handed down to us concerning the events of the past, and in this sense all history is tradition. But the different ways in which accounts of past events are handed down make a difference in the accounts themselves, which are accordingly designated by different terms. In the early ages of mankind and of every nation, when the art of writing was unknown or little used, all history was handed down by oral communication from generation to generation without written records. Afterwards when these were written down and assumed a definite shape, or many shapes, according to the information, the opinions, or the judgment possessed by the person or persons who wrote them down, such accounts would naturally be distinguished from accounts written by eye-witnesses at or soon after the times when the events happened. Historical criticism distinguishes the two kinds of history by calling the former *tradition*, in a narrower sense of the word, and the latter *history*. The characteristic peculiarity of tradition, in this sense therefore, is that for a time it was transmitted from father to son, or from generation to generation, by oral communication, and was subject to all the influences of such communication, until it became fixed by being put into a written shape. Those who know how, even in our days, reports are changed and embellished, how some features are omitted and others added during the process of passing from mouth to mouth, and how in the end they frequently assume a totally different aspect from

what they originally had, will readily admit that such traditions cannot be received with the same faith as contemporary history. It requires great judgment in an historical writer to handle tradition. His object should be to discover the genuine tradition or story, and to give it simply as he finds it; for thus we have at least a faithful memorial of the manner in which our ancestors conceived and viewed certain things.

In the history of Christianity the term tradition has been applied to the doctrines said to have been communicated by Christ to his apostles, which were not written down by them, but were handed down by their oral instruction to their successors, and were propagated in the church by the bishops, and prevented from becoming corrupt, like other traditions, by the influence of the Holy Ghost. This tradition is preserved in the writings of the ecclesiastical fathers, and the Church of Rome regards them, next to the Bible, as a source of knowledge which ought to regulate the life and religious observances of Christians. Thus the New Testament and tradition go hand in hand, and exercise a mutual influence upon one another by completing and explaining one another. The substance of the tradition thus revered by the Church of Rome however affects rather the forms of religion than its essence; and some of these forms are retained and observed by Protestants, while on the whole they reject tradition, and do not consider it binding.

TRAGACANTH. [ASTRAGALUS.]

TRAGEDY. [DRAMATIC ART AND LITERATURE.]

TRA'GIA, a genus of plants of the natural family of *Euphorbiaceæ*. The species are found in India and in America, are climbing in habit, and some are remarkable for stinging as violently as nettles.

TRAGOPO'GON, a genus of plants of the natural family of *Cichoraceæ*, which is usually considered only a tribe of the great order of *Compositæ*. The genus *Tragopogon*, or Goat's Beard is so named from the long silky beard or pappus of the seeds. *T. gracilis* is found in the Himalaya Mountains, and the leaves are eaten by the natives as lettuce is in Europe, but without being blanched. The best known species however is *T. porrifolius*, Salsify, which is occasionally cultivated in this country, but frequently in France and Germany. The English *T. pratensis* may be cultivated for the same purpose. The roots of Salsify are the parts esteemed; they are long and tapering, their flavour mild and sweetish, and are boiled or stewed like carrots. The stalks of year-old plants are sometimes cut in the spring, and, when similarly dressed, taste like asparagus.

TRAJANO'POLIS (the city of Trajan), or *Selinus*, was the most western town of Cilicia. The Emperor Trajanus having died at Selinus, this town was for some time called Trajanopolis. It was situated at the mouth of the river Selinus, on a steep rock, surrounded on three sides by the sea.

Another Trajanopolis was in Mysia, between Antandrus and Adramyttium.

A third Trajanopolis was a town in Thrace, most probably built by the Emperor Trajan, who adorned it with beautiful buildings. Trajanopolis was situated on the river Hebrus, at a little distance north of the pass which is formed by this river through the range of Mount Rhódope, and about 40 miles from its mouth. Trajanopoli, the modern town, is on the Maritza, or Hebrus, on or very near the site of ancient Trajanopolis. It is the see of a Greek archbishop, and is a small town of no importance.

TRAJA'NUS, MARCUS ULPIUS NERVA, was most probably born in A.D. 53, at Itálica, the present Alcalà del Rio, on the Guadalquivir, not far from Sevilla in Spain. Trajan the father, having obtained a command in Asia Minor, went there, accompanied by his son, who distinguished himself at an early age in the wars against the Parthians and the Jews. The son became consul in A.D. 91; and he afterwards commanded the legions on the Lower Rhine. His military talents and his amiable character made him popular with the troops; and the Emperor Nerva adopted him in A.D. 97, and chose him for his successor. Trajan's nomination of Cæsar was a new thing in Roman history, the imperial throne having hitherto been exclusively occupied by members of the old Roman aristocracy. Trajan was the first emperor who was born beyond the limits of Italy.

On the death of Nerva, in January, A.D. 98, Trajan became emperor, and soon proved that he deserved his high station. His virtues and eminent qualities are commemorated in the Panegyric of Trajan which Pliny the Younger read in the senate in A.D. 100. In 103 Pliny, who was a personal friend of the Emperor, was appointed proconsul of Bithynia and Pontus. The letters that passed between Pliny and Trajan are the best sources with regard to the private character of this emperor. (Pliny, 'Ep.,' lib. x.)

In A.D. 100 Trajan crossed the Danube to oppose the Daciæ; and in A.D. 102 their king Decébalus submitted and gave up part of his territory. Decebalus broke the peace in A.D. 104, and Trajan again advanced against him. To secure a passage over the Danube, Trajan constructed the great bridge of which Dion Cassius (lxviii., 13 ed. Reimarus, and the notes) has given a description. Decebalus was defeated, and killed himself, and in A.D. 106 Dacia was made a Roman province by Trajan, who sent there Roman settlers. To commemorate the Emperor's Dacian victories, a column was erected, in 114, by the architect Apollodórus, on the Forum Trajani, which still remains.

After the conquest of Dacia eight years of peace elapsed, which Trajan employed in a careful administration, and in adorning Rome with beautiful buildings; he also founded a library, the Bibliothéca Ulpia, and an institution for the education of poor children of Italian parents. In 114 Trajan left Rome to lead his armies against the Parthians, who were defeated, and in one campaign Trajan conquered Mesopotamia and delivered Armenia. He took up his winter-quarters at Antioch, relieved the Syrians, who were suffering from the consequences of a violent earthquake, and in the following year, 115, opened a new campaign. He crossed the Tigris, and the Parthians having

again been defeated, he took the towns of Nisibis, Edessa, Ctesiphon, and Seleuceia; Babylonia, Assyria, Armenia, and Mesopotamia became Roman provinces. Trajan now sailed with his fleet on the Tigris to the Persian Gulf, and when he had reached the sea, the example of Alexander suggested to him the idea of conquering India, but remembering his advanced age, he renounced that scheme. In 117 Trajan made an incursion into Arabia, and ordered a fleet to be kept on the Red Sea. Suffering from dropsy, he set out for Rome, but he died on his way, at Selínus, a town in Cilicia [TRAJANOPOLIS], in August, 117, at the age of sixty-three years nine months and four days, according to Eutropius (viii., c. 2). He was succeeded by Hadrianus.

TRAJECTORY, the technical name which was formerly given to a curve.

TRALEE. [KERRY.]

TRANCE. [CATALEPSY.]

TRA'NI, a town in the kingdom of Naples, situated on the coast of Apulia, 26 miles N.W. from Bari, in the province of Terra di Bari, gives title to an archbishop, and has about 15,000 inhabitants. The civil and criminal courts of appeal for the provinces of Terra di Bari and Terra d'Otranto hold their sittings in Trani. The town is well built: it has a castle, built by the Emperor Frederic II.; a handsome cathedral, several other churches and convents; and a harbour for small vessels. The inhabitants carry on a considerable trade in oil and corn.

TRANQUEBAR. [HINDUSTAN, vii. 198.]

TRANSCENDENTAL, a technical term in philosophy, derived from the Latin *transcendere*, to go beyond a certain boundary. In philosophy transcendental signifies anything which lies beyond the bounds of our experience, or which does not come within the reach of our senses. It is thus opposed to *empirical*, which may be applied to all things which lie within our experience. All philosophy, therefore, which carries its investigations beyond the sphere of things that fall under our senses is transcendental, and the term is thus synonymous with metaphysical. Transcendental philosophy may begin with experience, and thence proceed beyond it; or it may start from ideas à priori which are in our mind: in the latter case philosophy is purely transcendental, while in the former it is of a mixed character.

TRANSCENDENTAL, a mathematical term opposed to *algebraical*, and applied to those algebraical expressions in which something more than the common rules of arithmetic, or combinations of them, are required.

TRANSFUSION OF BLOOD is the operation of transferring the blood of one animal into the blood-vessels of another, and is sometimes beneficially employed for reviving those who are nearly dying after severe hæmorrhage. The operation has long been used as a means of experiment, and in the vain hope that by injecting the blood of a healthy man or animal into the vessels of a diseased one, the health of the latter would be restored; but it had rarely been employed for its truly useful purpose, till Dr. Blundell, after a long series of well-conducted experiments on animals, proved that it might be safely and advantageously employed in men. The operation has indeed often failed; it has often been unnecessarily performed; and its performance is not unaccompanied by danger to the patient; but still there is sufficient evidence of its high utility in cases which, without it, would have been quite or nearly hopeless, to warrant its being resorted to under the guidance of a sound judgment.

TRANSIT, or TRANSIT INSTRUMENT, an astronomical telescope, made to move in the plane of the meridian, so that the moment of any star passing a vertical wire in the middle of the field of view (and which covers a part of the meridian) may be ascertained. Usually there are several auxiliary wires at equal distances on each side of the middle wire, and the mean of the times at which the several wires are passed, is more accurately the time of meridian passage than that derived from the middle wire itself. The instrument was invented about 1690, by Römer.

The main uses of the transit instrument are either, by means of a star of known right ascension, to determine the time of observation, or else, by means of the observed time at which a star passes the meridian, to determine the star's right ascension. A full account of the instrument, its history, its errors, and the adjustments, whether mechanical or formular, by which they are corrected, will be found in the 'Penny Cyclopædia.'

TRANSITION ROCKS. When the general terms 'Primitive' and 'Secondary' were much in use among geologists, certain assemblages of rocks, which were of intermediate position, and seemed to unite the mineral aspect of the primitive with the organic enrichments of the secondary, were for these reasons called 'Transition Rocks.' The term was very extensively used by the pupils of Werner, and maintained, till within a few years, an important place in geological nomenclature. This classification has been since altered, and the original classes of primary and secondary rocks thrown into new and more appropriate groups.

TRANSITS OF MERCURY AND VENUS. The inferior planets, as they are called, whose orbits are within that of the earth, may sometimes appear to pass over the body of the sun, eclipsing by their opacity successive parts of the solar surface. The transits of Mercury and Venus are phenomena of this kind. They do not take place very often, as they can only be when the planet is in or very near to the node of its orbit, at the time when a line drawn through the sun's centre and that node passes through the earth. As the nodes of the planets alter their positions on the ecliptic very slowly, it will happen for many centuries together that these appearances can only take place at stated periods of the year in which they happen: a transit of Mercury is always either in May or November (according to the node of the orbit at which it takes place), and one of Venus in June or December. The first transit of Mercury which was observed took place in 1631, and of Venus in 1639, and the following are the dates of those which have occurred since, or will occur for a long time to come:—

Transits of Mercury.

Nov. 6, 1631.	Nov. 10, 1736.	Nov. 11, 1815.
Nov. 8, 1644.	Nov. 2, 1740.	Nov. 4, 1822.
Nov. 2, 1651.	Nov. 4, 1743.	May 5, 1832.
May 3, 1661.	May 5, 1753.	Nov. 7, 1835.
Nov. 4, 1664.	Nov. 6, 1756.	May 8, 1845.
May 6, 1674.	Nov. 9, 1769.	Nov. 9, 1848.
Nov. 7, 1677.	Nov. 2, 1776.	Nov. 11, 1861.
Nov. 9, 1690.	Nov. 12, 1782.	Nov. 4, 1868.
Nov. 2, 1697.	May 3, 1786.	May 6, 1878.
May 5, 1707.	Nov. 5, 1789.	Nov. 7, 1881.
Nov. 6, 1710.	May 7, 1799.	May 9, 1891.
Nov. 9, 1723.	Nov. 8, 1802.	Nov. 10, 1894.

Of these the transits yet to come in 1861, 1868, and 1878, will be visible (weather permitting) in this country.

Transits of Venus.

Dec. 4, 1639.	Dec. 8, 1874.	June 7, 2004.
June 5, 1761.	Dec. 6, 1882.	June 5, 2012.
June 3, 1769.		

Of these the transits of 1882 and 2004 may be visible in this country.

TRANSLATION. This word is used in mechanics, as distinguished from *Rotation*, in the following manner :—A body has motion of translation when all its points move in parallel straight lines; when, in fact, all its points have the same motion. If all have not the same motion, there is either simple rotation, that is, about one permanent axis; or rotation about a varying axis; or else a compound of translation and rotation. The motion of a single point must always be called translation, rotation being an inadmissible idea.

The point which is called the centre of gravity of a system, and which is of no small importance in the theory of equilibrium, has yet more in that of motion. The motion of any free system is compounded of the translation of its centre of gravity, and the rotation about an axis (whether always in one direction or not) passing through its centre of gravity. Now whatever the forces may be by which such a system is either set in motion, or acted on while in motion, the translation of its centre of gravity may always be made a distinct problem from the rotation about its centre of gravity, by the following simple rules :—

1. The centre of gravity moves just as it would do if the whole system were there collected, and all the forces were there applied.

2. The rotation of a system about its centre of gravity is no other than what it would be if that centre were made a fixed point, and all the forces applied in their proper places.

TRANSPIRATION, PULMONARY, is the exhalation of watery vapour, which is constantly going on from the blood circulating through the lungs.

TRANSPLANTING. [Planting.]

TRANSPORTATION (*trans* and *porto*), removal, banishment to some fixed place. Under Punishment, the general nature of punishment has been considered. Other punishments will be briefly considered here. The object of this article is not to discuss fully so extensive a subject, but to indicate the various departments into which it may be distributed, which division will show the complicated character of that class of punishments commonly called *Secondary Punishments*, which comprise Transportation and Imprisonment, with all the particular punishments which are employed in connection with Transportation and Imprisonment.

A complete discussion of *Transportation* would include an account of the history of its origin as a mode of punishment, or consideration of the general principles on which it is based, and the acts of parliament relating to it; the system under which it was carried into execution in the American colonies; system under which it was conducted in the early history of the Australian colonies; system on which it was more recently executed in New South Wales, Van Diemen's Land, and Norfolk Island, with a description of the systems of assignment and ticket of leave, chain-gangs and road-parties; the recent changes in the system at home and abroad; the experiment of isolation as applied to the punishment of given offences in America and Europe; the foundation of Pentonville Prison; the new system of probation; and statement of the expense of transportation under the various schemes yet tried.

Connected with this is the subject of *Hulks*: their origin, design, and history; description of a hulk; discipline of convicts in the hulks; employments; expense of the system and its faults.

Thirdly, *Prisons*—their state at the beginning of the last century, and the history of improvements in them; the system of classification; the silent system—its theory and practical working; regulations of the prisons in which the system is in force; the labour imposed on the prisoners; the tread-wheel; the crank-machine; the expense of the silent system; the separate system; its theory and objections to it; its origin and history in England; the principles of prison construction; employments of prisoners; expense of the system; prisons of England generally; treatment of untried prisoners; disposal of prisoners after their discharge; prisons for juvenile offenders.

Fourthly, Institutions in England auxiliary to those for punishment, or Houses of Reformation; Refuge for the Destitute; House of Occupation; Ragged and Industrial Institutions; Philanthropic Institution.

Fifthly, Prisons in Scotland and Ireland, and in the British dependencies.

Lastly, the progress of penal reform in foreign countries.

We can give only the outlines of such a statement: the whole would well occupy a volume.

The statute of 39 Eliz., c. 4, for the banishment of dangerous rogues and vagabonds, was virtually converted by James I. into an act for transportation to America by a letter to the treasurer and council of the colony of Virginia, in the year 1619, commanding them 'to send a hundred dissolute persons to Virginia which the knight-marshal would deliver to them for that purpose.' Transportation is not distinctly mentioned in any English statute prior to the stat. 18 Car. II., c. 3, which gives a power to the judges at their discretion either 'to execute or transport to America for life the moss-troopers of Cumber-

land and Northumberland.' Until after the passing of the stat. 4 Geo. I., c. 2, continued by stat. 6 Geo. I., c. 23, this mode of punishment was not brought into common operation. By these statutes the courts were allowed a discretionary power to order felons who were by law entitled to their clergy to be transported to the American plantations. Transportation to America under the statutes of Geo. I. lasted from 1718 till the commencement of the War of Independence in 1774.

A plan for the establishment of penitentiaries, which was strongly recommended by Judge Blackstone, Mr. Eden (afterwards Lord Auckland), and Mr. Howard, was taken into consideration by parliament, and the act 19 Geo. III., c. 74, for the erection of penitentiaries passed. But the government failed to adopt the necessary measures for its execution; and tranportation was resumed by an act passed in the 24th year of Geo. III., which empowered his majesty in council to appoint to what place beyond the seas, either within or without his majesty's dominions, offenders should be transported; and by two orders in council, dated 6th December, 1786, the eastern coast of Australia and the adjacent islands were fixed upon. In the month of May, 1787, the first band of convicts left England, which in the succeeding year founded the colony of New South Wales.

The present condition of a transported felon is mainly determined by the 5 Geo. IV., c. 84, the Transportation Act, which authorises the king in council 'to appoint any place or places beyond the seas, either within or without the British dominions,' to which offenders shall be conveyed, the order for their removal being left to one of the principal secretaries of state. The places so appointed are the two Australian colonies of New South Wales and Van Diemen's Land; the small volcanic island called Norfolk Island, situated about 900 miles from the eastern shores of Australia; and Bermuda. The 5 Geo. IV., c. 84, gives to the governor of a penal colony a property in the services of a transported offender for the period of his sentence, and authorises him to assign over such offender to any other person. The 9 Geo. IV., c. 83, empowers the governor to grant a temporary or partial remission of sentence; and the 2 & 3 Wm. IV., c. 62, limits his power in this respect. In New South Wales and Van Diemen's Land convicts are subject to a variety of colonial laws, framed by the local legislatures established under the act 9 Geo. IV., c. 83. ('Report of the Select Committee of the House of Commons on Transportation,' 1838.)

The various offences for which transportation is the penalty are mentioned in the article 'Law, Criminal,' in the 'Penny Cyclopædia.'

Howard, Beccaria, Bentham, Dr. Whately, and other writers on the theory of punishment, have condemned the general principle of transportation; and comparatively little has been urged in opposition to their arguments. Mr. Bentham's objections will be found in a chapter on Transportation, in his 'Theory of Punishments;' the archbishop of Dublin's, in his two 'Letters to Earl Grey.'

The notice of parliament does not appear to have been called to the hulks between the passing of the 19 Geo. III., c. 74, at the instance of Howard and Blackstone, and the year 1783, when an act was passed, the 24 Geo. III., sess. 1, c. 12, converting the hulks from prisons, in which criminals were to be punished by hard labour, into places of temporary confinement for convicts, between the period of their sentence to transportation and the completion of the necessary arrangements for carrying that sentence into execution. The management of the convicts was given to officers called overseers, whose powers corresponded with those of the superintendents under the former act.

The time of the offender's confinement was to be reckoned in discharge or satisfaction of the term of his transportation, as far as it might extend. Similar returns to parliament or the King's Bench were required under this as under the former act. The 24 Geo. III., sess. 1, c. 12, was repealed by the 24 Geo. III., sess. 2, c. 56, but its provisions were incorporated in this act, with the exception of those concerning the labour of the convicts, which it was provided should be compulsory. This last act was continued by various other acts till the year 1815, without any alteration in its purpose, excepting in the 28 Geo. III., c. 24, and the 42 Geo. III. By the former of these it was provided that the convicts should be visited and treated as offenders sentenced to hard labour, and that the expenses occasioned by their maintenance or death should be defrayed by the overseers. By the latter the interest of the contractors was limited to that of supplying provisions, clothing, and other necessaries to be consumed in the hulks. The 55 Geo. III., c. 156, repealed and re-enacted by the 56 Geo. III., c. 27, empowers the king to appoint a person to the office of superintendent, and the persons to be deputy or assistant superintendents, also resident overseers. The latter of these acts was continued by the 1 & 2 Geo. IV. for two years, and its provisions were then re-enacted with some variations, in the 5 Geo. IV., c. 34. ('Statements and Observations concerning the Hulks,' by George Holford, Esq., M.P.)

From the time when Howard brought the disgraceful state of the Justitia, the first vessel stationed at Woolwich, before the House of Commons, until within the last few years, the hulks in all the dockyards of the empire remained in the most disgraceful condition. They are now somewhat improved. But the chief faults and abuses in their management cling to them as if inherent in the very nature of the system. Opinion is now almost unanimous against them as they have hitherto been conducted. (Duncombe's 'Report;' Hepworth Dixon's 'London Prisons.')

Prisons (*Prison*, French) are places of safe custody, of punishment, and of reform.

The history of practical improvements in the prisons of this country begins with Howard. He was not however the first to expose the vices of the old system. His recent biographer has discovered a document in the archives of the Christian Knowledge Society, which shows that in the

reign of Queen Anne a well-conceived attempt was made to reform the London prisons by Dr. Bray and other members of the society; but the task was found to be so gigantic and so repulsive, that after a short period of effort it was entirely abandoned. The description of the management of Newgate there given comprises:—'1, the personal lewdness of the keepers and under-officers, who often make it their business to corrupt the prisoners, especially the women; 2, their confederacy with prisoners in their vices, allowing the men to keep company with the women for money; 3, the unlimited use of brandy, wine, and other strong liquors, even by condemned malefactors; 4, swearing, cursing, blasphemy, and gaming; 5, old criminals corrupting new comers; 6, neglect of all religious worship.' A quarter of a century later public attention was again directed to the state of the metropolitan gaols by some horrid reports which got abroad: a parliamentary enquiry took place under the direction of Mr. Oglethorpe, and the revelations which it made as to the cruelties exercised in prisons, and the fearful immorality of all parties connected with them, produced a strong impression on the public mind. A change of keepers then took place, and some amendments were introduced into gaol administration; but the chief vices of the system remained until the time of Howard. (Dixon's 'Life of Howard,' c. i.) In the first section of his work on 'The State of Prisons in England and Wales,' which he entitles 'A General View of the Distress in Prisons,' published in 1775, Howard presents a summary of the abuses which existed in the management of criminals at that time. These abuses related to food, ventilation, drainage, want of classification of prisoners; and the effects were disease and the further corruption of all persons who were confined in prisons.

The labours of Howard and of others were slowly attended with success. Nearly fifty years after the date of the above details the Prison Discipline Society remark, that there yet exist many prisons in the same condition as that in which Howard left them—monuments of the justice of his statements, and of the indifference with which his recommendations had been regarded. In 1818 it appears, by parliamentary returns, that out of 518 prisons in the United Kingdom, to which upwards of 107,000 persons were committed in that year, 23 prisons only were classed or divided according to law; 59 prisons had no division whatever to separate males from females; 136 had only one division for that purpose; 68 had only two divisions, and so on; 23 only were divided according to the regulations of the statute (24 Geo. III., c. 54, sect. 4), which provides for eleven. In 445 prisons no work of any description had been introduced; in 73 prisons, though some work was performed, yet the number was exceedingly small in which employment to any extent had been carried on. In 100 gaols built to contain only 8545 prisoners, there were at a time 13,057 persons confined.

During the last quarter of a century many reforms have been effected; others are still in progress. The work begun in America. The first effort was to obtain some sort of classification of prisoners. Hopes were entertained that this system of classifying was the one thing needed, but it soon proved an absolute failure; for, although there is a natural basis for it in the difference of age and sex, it was very soon perceived, when the plan was practically carried out, that the desideratum was a moral not a material classification, and for this no certain basis could be discovered, either in nature or legal decision.

This plan of classification failing, the advocates of a reform in the old and insufficient modes of criminal treatment, took up with the *Silent System*. The advocates of this system supposed that contamination would be prevented by the intercourse of the tongue being prohibited. The first objection to the execution of this plan was the expense of employing a requisite number of officers to enforce silence. To mitigate or get rid of this objection, the practice of giving to prisoners a control over other prisoners was introduced. In the larger class of prisons, particularly those in London, this part of the plan was afterwards abandoned, but in many of the small country gaols the practice still prevails. It is not easy to characterise the silent system of prison discipline in a few words, for it has undergone considerable alteration in the course of twenty-five years. The *silence* is now the least part of it, and the only word that will truly indicate its leading characteristic is the compound associated-silent-labour system. At first the tread-wheel, the crank, and the oakum-room, were the only employments; gradual innovations have been made in this respect, until we find nearly all the ordinary trades—carpentry, tailoring, cobblery, mat-making, baking, &c., pursued, and in many instances actually taught, within the prison by well-paid instructors.

The power of establishing rules for prisons is vested by 5 and 6 Wm. IV., c. 38, in the secretary of state for the home department. Distinct divisions of each prison are appropriated to male and female prisoners. The several wards, cells, yards, &c., are devoted to distinct classes of prisoners. There are baths for the cleansing and bathing of prisoners; a fumigating oven for the cleansing and disinfecting of their clothes, linen, or bedding. A competent number of cells adapted to solitary confinement for the punishment of refractory prisoners, and for the reception of such as may by law be sentenced to confinement therein, is provided. Separate rooms are provided as infirmaries or sick wards for the two sexes, and as far as possible for the different descriptions of prisoners. Every prisoner is provided with suitable bedding, and every male prisoner with a separate bed, hammock, or cot, either in a separate cell, or in a cell with not less than two other male prisoners. Convenient places are set apart for washing, combing, &c., and yards for exercise. It is provided by law that the visiting justices appointed at each quarter-session shall meet periodically at the prison and inspect the several journals, registers, and books, and give such directions as may to them seem necessary; that they shall regulate a scale of fines to be levied by the governor upon the subordinate officers for negligence in the

performance of their duties; that they may suspend any officer; examine from time to time the state of the buildings, the classification, separation, inspection, hard labour, employment, health, diet, instruction, &c., of the prisoners; also into the amount and disposal of their earnings, the expenses attending the prison, and any improvement which may be practicable; they are required to direct such books as they think proper to be distributed for the use of the prisoners who do not belong to the established church; they may enter into contracts for the employment of prisoners in any work or trade within the prison, subject to the sanction of the general or quarter sessions; they may authorise any prisoner to be employed in the service of the prison, but not in the service of any officer in control or instruction of any other prisoner; they may order necessary clothing or tools to be given to any prisoner on his discharge, or may pay his passage home, or present him with such a moderate sum of money as they may think fit; they are required to make a report respecting the state of the prison at every quarter sessions; in case of contagious disease, or any other emergency, they are empowered to issue an order under their hands or seals, to remove the prisoners to some other prison or place of confinement within their jurisdiction; in case of any criminal prisoner being guilty of repeated offences against the rules of the prison, or of any greater offence than the governor is authorised to punish, a visiting justice may order the offender to be punished by solitary confinement, and in case of absolute necessity, by confinement in irons; a visiting justice may receive the complaint of any prisoner. Spirits, wine, beer, and tobacco, are prohibited to any prisoner excepting in cases approved of by the surgeon. For every prison it is provided that there shall be a governor, chaplain, and surgeon; and for the female branch of the prison, a matron; and a sufficient number of school masters and mistresses, male and female turnkeys, and subordinate officers; none of whom, excepting the chaplain and surgeon, are allowed to hold any office or have any occupation except what refers to the prison.

A different dress is worn by a prisoner convicted of felony from one convicted of a misdemeanor: he is employed, unless prevented by sickness, at such hard labour as can be provided, and for so many hours (not exceeding ten) daily, except on Sundays, Christmas-Day, Good-Friday, or any public feast or thanksgiving day. Some descriptions of misdemeanants are allowed to wear their own clothing, if deemed sufficient and proper; and they have various other privileges. Prisoners convicted of felony, but not sentenced to hard labour; prisoners convicted of misdemeanor, who do not come under the description contemplated in the above detail; and other convicted prisoners not sentenced to hard labour, must be clothed in a particular dress, and employed in some work or labour which is not severe; and they are restricted to a prison diet. They are required, like all other prisoners, excepting misdemeanants of the first division, to preserve silence.

While the experiment of silent association of prisoners was in course of trial in this country, a new system—the isolated—was attempted in the United States. At first, from keeping the prisoners in perfect solitude, the most frightful results followed. Some went mad; some became idiotic; and some contrived to put an end to their existence; the rest had all to be pardoned and set at liberty. This gave the public a horror of isolation. A minor form of the same species of punishment was then tried, under the name of the *Separate System*, which only contemplated the separation of one prisoner from another. Its advocates were careful to point out how different was this new plan to the other—in providing the prisoner with everything necessary to cleanliness, health, and comfort, during the day, and for repose at night; in giving him employment; in separating him from none of the inmates of the prison except his fellow-prisoners, in allowing him the privilege of attending both chapel and school; and in providing him with the means of taking exercise in the open air. Experience however has shown that the advantages of this system are more apparent than real. ('Inspector's Report,' 1838.)

The separate system differs in many essential particulars from the silent system. It originated in this country in the year 1790, and was first tried in the county gaol, Gloucester. This building was provided with cells, in which prisoners were confined apart, day and night. Those confined under short sentences were denied, those under long sentences were provided with, employment. Moral and religious instruction was given in the cells and in the chapel. This discipline was enforced during seventeen years, in which period there were very few recommitments. But the increase of population demanding increased prison accommodation, the system was abandoned to make room for additional prisoners. In 1811 the favourable opinion conceived of separation in prisons by a committee of the House of Commons led to a recommendation 'that a separate prison should be erected in the first instance, for the counties of London and Middlesex, and that measures should be taken for carrying on the penitentiary system, as soon as might be practicable, in different parts of the country.' In the following year (1812) the act 52 Geo. III., c. 44, was framed in conformity with the committee's recommendation, by which act the Penitentiary at Millbank was commenced in 1813—subsequent acts granting leave to increase its accommodations. In 1821 this great prison was completed for the reception of 1200 convicts, for England, Scotland, and Wales. The separate system did not begin to be carried out for some years after the establishment of Millbank Penitentiary, and after having been for some time in operation it was abandoned, owing to the great mortality which prevailed there. The separate system can only be carried into effect under favourable conditions.

A model prison on the separate system at Pentonville, London, has been completed for some years, and many others have been built in different parts of England; but the success or failure of the system has not yet been clearly demonstrated by experience. Opinion is divided as to

the results, both in the country and in parliament; and while we hear of new gaols to be built on the cellular system under the sanction of government, that government, in its own prison at Millbank, is breaking down the party walls and throwing the galleries of separate cells into large work-rooms.

The improvement in prison discipline has little more than commenced; and even in the metropolis vices which have been long admitted as such continue in undiminished force. The unfavourable description of the great gaol of Newgate, given by the Inspectors of Prisons in their report for 1837, is the same in all its essential particulars with Mr. Dixon's account ('London Prisons,' c. 8), published in 1850.

Prisoners committed for trial or for examination are permitted to wear their own clothing in prison, provided it be sufficient; they are not compelled to work or labour; but at their own request or with their own consent may be supplied with any work not severe, or they may, at their own expense, procure any employment, materials, and tools, which the governor may deem safe and proper. Provided no bill has been found against a prisoner, or that upon his trial he has been acquitted, he is allowed such a proportion of the amount of his earnings as the visiting justices deem fit and reasonable. Prisoners of this class are permitted to see their friends on any week-day without any order, within specified hours; and their legal adviser at any reasonable hour. Letters to and from them are subject to the inspection of the governor. They are liable, in case of their being riotous or disorderly, or being guilty of a breach of the regulations, to be confined in separate cells, and be allowed no other food from the county than bread and water. ('Regulations for Prisons in England and Wales,' issued by the Secretary of State, 1841.)

The application of the separate system to untried prisoners has been more recently carried into operation in the new Clerkenwell Prison, Middlesex. For this class of detenus the system is less liable to objection. The shortness of the time which they continue under its rigours prevents the more serious evils of segregation from showing themselves; but the question will force itself on attention—why should men, not yet proved to be guilty, and many of whom must in the nature of things be innocent, be subjected, even for a few days, to so terrible a punishment?

The disposal of criminals after the expiration of the period of their imprisonment is in England one of the most difficult questions connected with punishments, and it is one for the settlement of which no measures have yet been adopted or devised. Until this deficiency is supplied, under any system of secondary punishment whatever, the immense amount of recommitments which take place in this country may be expected to continue. The amount of recommitments is an evidence not merely of the inefficiency of particular modes of punishment, but probably more generally of the difficulty of finding employment in this country. Mr. Bentham suggested several means whereby this object might be met: employment in the army or navy; the encouragement of voluntary emigration to the colonies; the requiring of security for good behaviour, with liberty to the surety to contract for the prisoner's labour; or a subsidiary establishment for the reception of the prisoners under a modified kind of imprisonment. Of these methods it is not improbable that the encouragement of voluntary emigration will be resolved upon. It is a question whether the emigration should not be compulsory instead of voluntary. But to this it has been objected, that making emigration thus as it were a punishment or part of a punishment, would tend to render it, by association of ideas, a mark of disgrace, whereas it is desirable that industry should be encouraged to find channels for itself in the colonies.

Until recently there was no further distinction observed in the discipline of juvenile offenders than by their separate classification from the adults in the hulks, in prisons, &c., where they were put to the same or nearly the same routine of duties as the adults: but with the establishment of the Parkhurst Reformatory, in the Isle of Wight, the commencement of systematic improvement in this respect has been made.

The objects sought to be attained at the Parkhurst Prison are the penal correction of boys with a view to deter juvenile offenders generally from the commission of crime, and their moral reformation. The disposal of the boys at Parkhurst on their release was for a long time a question of some difficulty. Of those liberated since its establishment some were apprenticed to the trades in which they were educated there; others were sent to the Refuge for the Destitute, and the Philanthropic Institution, and a considerable number to New Zealand. Thirteen years have now (1850) elapsed since the opening of the Parkhurst Prison, and its results have been highly satisfactory. The establishment originally provided for 320 boys, but it has been so materially enlarged as to be capable of accommodating 720.

Experience has at length determined in favour of general emigration to the colonies; and all the boys are now sent out, after undergoing a long and in some respects admirable course of instruction in the elements of education, and in some trade or handicraft which may be turned to account in the Australian states, whither they are to be finally sent.

The Prisons Regulation Act (5 and 6 Wm. IV., c. 38) empowers one of the principal secretaries of state to appoint a sufficient number of persons, not exceeding five, to visit and inspect, either singly or together, every gaol, bridewell, house of correction, penitentiary, or other prison or place for the confinement of prisoners in any part of Great Britain; and to examine officers, inspect books and papers, and inquire into all matters relating to the management and discipline of such place of confinement, and to deliver to the secretary of state a report thereon.

There are several institutions auxiliary to the penal institutions of the country. The institutions referred to are either wholly supported by voluntary contributions, or partly by voluntary contributions and annual parliamentary grants,

and their objects are to receive convict youths after they have endured the sentence of the law, as voluntary inmates, and to educate them in suitable branches of knowledge, and in useful trades; or to receive the destitute offspring of adult convicts who have been executed or transported, or are imprisoned for a lengthened period, and to give them the advantages mentioned. In the metropolis there are the Refuge for the Destitute; the House of Occupation in St. George's Fields, to which boys are committed from the Bridewell by the city magistrates; the various industrial schools connected with Ragged Schools. The Philanthropic Society's Institution is now removed from St. George's Fields to the neighbourhood of Reigate.

The Refuge for the Destitute was founded in 1805, and incorporated by act of parliament in 1838. It is a place of refuge for young persons of both sexes, discharged from penal confinement; or who, having lost their character by dishonest practices, are unable to procure an honest maintenance. The females in the establishment are employed in washing and in needlework, for which the institution contracts with the public, and in household work. The males are employed in shoemaking, tailoring, and preparing fire-wood for sale.

The House of Occupation is an ancient foundation. The inmates, about two hundred in number, are half males, half females; the majority of them have not actually been in prison, but they are all idle, mutinous, unmanageable children, who would have grown up into the future bandits of society. They are taken in, educated in a useful trade, and after several years of strict and careful training are placed in situations. The girls make good domestic servants, and are much in request.

Since the Philanthropic Society removed its institute to Reigate, the programme of training has been considerably altered. Various trades are still taught; but the basis of the education given is agriculture, so as better to prepare the youths for a colonial life. This institution is entirely dependent on the voluntary support of the public.

The prisons of Scotland were in a state of gross mismanagement when, in 1826, a committee of the House of Commons was appointed to inquire into the subject. The recommendations of that committee, the appointment of inspectors, and the passing of an act of parliament (2 & 3 Vict., c. 46), by which the burden of maintaining prisons is removed from the royal burghs, and provided for by a general rate upon property, and their management is devolved upon county boards and upon a general board sitting in Edinburgh, have led to some improvements, and paved the way for still greater.

The gaols of Ireland are regulated by an act of parliament (7 Geo. IV., c. 74), passed in 1826, by which annual reports of the state of the several prisons are required from inspectors of prisons who had been appointed some years previously. From the reports of the inspectors a lamentable picture is to be drawn of the management of the prisons so recently as 1849. Industry appears to have been only partially introduced; classification, where it is attempted, is of the most imperfect description; and lunatics are frequently committed to prison simply as being dangerous to society, of which practice the results are, 'that each prison in the kingdom has charge of from five to ten lunatics, and even more, to the great injury of the internal discipline and peace of the establishment, as well as to the poor individuals, as there is no proper accommodation for them, or means of treating the disease with a view to cure.' The prisons were all overcrowded, and the rate of mortality fearfully high.

TRANSPOSITION, the name given in algebra to the process of removing a term from one side of an equation to another, changing its sign. Thus, if $a = b + c$, by transposition $a - c = b$. On this we have only to remark, that in this instance the rule is not much of an abbreviation. If we say 'transpose c,' instead of 'take c from both sides,' so little is gained, that it may be doubted whether it would not be better to follow the continental writers in the use of the latter form of expression: a process which would have the advantage of being a perpetual appeal to reason instead of rule.

TRANSPOSITION, in Music, is a change of the original key to one higher or lower. This is generally performed, at a moment's notice, by the accompanist. He must assign to all the notes, as regards their pitch, or their situations on his instrument, names wholly different from those in the copy placed before him. To accomplish this he has to suppose a change of clef, or clefs, and thus give new designations to all the lines and spaces. For instance—a pianoforte player is required to transpose an air a whole tone lower, from A to G. For this purpose he must assume a change in both clefs, the treble into the tenor, and each note to be played an octave higher than it is written; the base into the alto, and each note to be played an octave lower than it is written. The difficulty attending this process is so great, that no amateur, and few discreet musicians, unless professed accompanists, or well acquainted with the composition to be transposed, will undertake the task.

TRANSUBSTANTIATION. [SACRAMENTS.]

TRANSVERSAL, a name given to a line which is drawn across several others, so as to cut them all.

TRANSVERSE, a name often given to one of the axes of a figure, usually that of greatest magnitude, or which goes most directly across the figure. Thus the longer axis of an ellipse or hyperbola is called the transverse axis. Properly speaking, it ought to be only a term of relative distinction: either axis is transverse to the other.

TRANSYLVA'NIA, a crown-land of the Austrian Empire, with the title of Grand Duchy; lies between 45° 12′ and 47° 42′ N. lat., 22° 15′ and 26° 20′ E. long.: its greatest length from N.W. to S.E. is 194 miles, and its greatest breadth from W. to E. is 184 miles. It is bounded N. by Hungary, E. by the Bukowina and Moldavia, S. by Wallachia, and W. by Hungary. The Germans call it *Siebenbürgen*, the Hungarians *Erdely Orzag*, 'woody country.' The Latin name Transylvania was given to it by the Hungarians from the circumstance that extensive woody mountains separate it from Hungary. The eastern and southern

boundaries are formed by the Carpathian mountains, the passes of which are of great military importance, being the only ways of communication between Transylvania on one side, and Moldavia and Wallachia on the other. The following lead to Wallachia:—1. *The pass of Zaikan* in the valley of the Hatzeg, in the county of Hunyad. This pass is called the 'Iron Door' on account of the high and steep rocks by which it is bounded. 2. *The pass of Vulkan*, near the village of Krivadia, in the county of Hunyad, famous for the bloody defeats which the Turks have suffered there in different wars. 3. *The pass of the Rothen-Thurm*, or the 'Red Tower, the most remarkable of all. Formed by the narrow valley of the Alt, it begins near the village of Boitza or Ochsenkopf in Transylvania, and it ends near the convent of Kosia in Wallachia. The length of this pass is 11 leagues, and the greater part of the road is hewn in the rock. 4. *The pass of Fortschwar* or *Terzburg*, in the district of Kronstadt. 5. *The pass of Tomosch*, south of Kronstadt, formed by the valley of the river Tomosch. 6. *The pass of Boza*, in the district of Kronstadt. The passes of Oytosch, Gymesch, and Paritsch, or Bereczk, lead into Moldavia, and the Borgo Pass makes the communication with the Bukowina.

Transylvania is a table-land, bounded on the E. and the S. by the principal range of the Carpathians; on the N. by a branch of the Carpathians, which beginning at Mount Gallatz, stretches westward as far as Mount Pleska, and thence to the N.W. as far as Mount Pretrosza in Hungary; and on the W. by an extensive system of mountains, which is composed of three large groups. The southern group begins near Mount Kosztara, stretching northwards from the southern boundary as far as the river Maros: the centre of this group, Mount Kuska-Poyana, is 9300 feet high. The second group lies between the Maros, and 47° N. lat., sending out lofty and extensive branches E. and W. The third group begins at 47° N. lat., and stretches as far as 47° 35′ N. lat.; the southern part of it is called the Reuss-Mountains, and the northern part is known by the German name of the Buch-Gebirge. Between the northern slopes of the Buch-Gebirge and Mount Pleska in the E., lies the valley of the Szamos, which is one of the few larger passes between Transylvania and Hungary, another being formed by the valley of the Maros. The middle of Transylvania is traversed by several parallel ranges of mountains, the direction of which is generally from N.E. to S.W.; the elevation of the summits is less than that of the Carpathians, and in many districts they are mere hills. Plains are rare in Transylvania. Extensive tracts of the hilly and mountainous parts are covered with forests.

All the important rivers of Transylvania are tributaries of the Danube, either flowing directly into this river, or joining the Theiss. *The Maros* rises on the eastern frontier at the foot of Mount Tatarrhago. It runs with many windings and a general western course past Karlsburg and Arad; and enters the Theiss opposite Szegedin. The whole length of this river is above 300 miles, 190 of which are in Transylvania; it is navigable for boats at Karlsburg: it contains abundance of fish, and brings down particles of gold. The most important of its southern tributary rivers is the Great Kükullo, which receives the Little Kükullo. On its northern side the Maros receives the Aranyos, which flows eastwards from the frontier of Hungary, and is navigable in its lower course. The *Szamos* is formed by the junction of the Great and Little Szamos. The Great Szamos rises in the N.E. of Transylvania, and runs S.W. as far as Deez, where it is joined by the little Szamos, which flows N.E. past Klausenburg from the western frontier. From Deez the united stream first runs N.W., then S.W., and at last N., till it reaches the northern boundary a little above Szada: it joins the Theiss at the village of Apata. The whole length of the Szamos is upwards of 200 miles, and three-fourths of its course are in Transylvania. *The Alt* or *Aluta*, rises a little E. of the source of the Maros to the S. of Mount Tatarrhago; it runs at first from N. to S. in an Alpine valley bordered by high and steep rocks, till it reaches the limits of the district of Kronstadt, near Illyefalva. There it turns suddenly N.N.W., but soon again changes its direction to S.W. and W., as far as the southern environs of Hermannstadt, whence it flows S. through the Rothen-Thurm Pass, and as far as its junction with the Danube opposite Nikopoli. The length of the Alt is about 250 miles, 134 of which are in Transylvania. The Austrian government have succeeded in making the Alt navigable in Transylvania; the Wallachian part of it is still in a state of primitive wildness. There are some lakes of importance. The lake of Hados in the county of Doboka is 15 miles long; the lake of St. Anna near Lazarfalva in the country of the Szeklers is 10 miles long and as many broad; the lake of Piritsch in the Carpathians is renowned for the gas which its surface exhales, and which suffocates birds that fly over it: the Holt-Maros is a lake formed by the Maros near Karlsburg.

Severe cold varies with extreme heat: the summer days are very hot, especially in the valleys and in the western and southern parts of the country, and the nights are cold; in the winter the cold is almost insupportable. In the east the temperature is wet and cold, and not favourable for grain. Cold winds prevail in the spring and autumn, and they blow with great regularity. Dreadful storms followed by sudden severe cold are frequent.

The southern and western parts are intersected by hills which contain pleasant valleys, and the soil is of great fertility: the eastern and northern parts and a tract along the western frontier are covered with forests, and the soil is stony in many districts; but even the stony surface is covered with a layer of soil which renders it fit for agriculture. The chief mineral products are iron, lead, copper, quicksilver, sulphur, silver, gold, rock and spring salt, of which great quantities are exported to Hungary and the Bukowina; various kinds of precious stones are found in the mountains and rivers. The mineral-waters are celebrated. Besides enormous quantities of timber, Transylvania produces wheat, barley, corn, oats, millet, and maize; apples, pears, and other fruits in

abundance; good wine and tobacco, especially in the valley of the Alt. The breeding of cattle chiefly occupies the Wallachians in Transylvania: sheep are numerous. There are fish, wild and tame fowl, and game of all sorts in abundance; wolves are frequent in the Carpathians, and even bears and lynxes appear. The horses are small, but swift, and very fit for light cavalry. Manufactures scarcely exist, except in the valley of the Alt, where the Germans produce some fine dyed cloths and cotton, felt-hats, leather, and linen. The commerce with Wallachia, Moldavia, and Turkey, is of some importance.

The whole area of the grand-duchy of Transylvania is 21,122 square miles, and the population in 1842 was about 2,000,000; it is divided into the country of the Hungarians; the country of the Szeklers; and the country of the Saxons.

The country of the Hungarians occupies the northern and western parts of Transylvania; it is divided into 11 counties and 2 districts. The principal town is CLAUSENBURG. *Karlsburg* or *Weissenburg*, a strongly-fortified town, with 6000 inhabitants, on the Maros, has a mint, observatory, public library, and is the seat of the Roman Catholic bishop of Transylvania. In the environs are rich gold-mines. *Nagy-Enyed*, farther up the Maros, has 6000 inhabitants and a college, which is the principal school for those of the Reformed religion. *Varhely* is in the valley of the Hatzeg, and occupies the site of the Ulpia Trajana of the Romans: its environs are full of Roman antiquities. *Thorenburg*, with 6000 inhabitants, has rich mines of rock-salt, which produce 240,000 cwt. per annum. *Doboka*, a small village inhabited by Wallaks, gives name to the county of Doboka, which lies along the Little Szamos, between the districts of Bistritz and Klausenberg, and of which Szek is the chief town.

The country of the Szeklers lies between the Carpathians and the districts of the Hungarians and Saxons. It contains five Jurisdictions. The principal town *Neumarkt* (Maros-Vazarhely), with 10,000 inhabitants, contains the chief seat of justice of the country of the Szeklers, a Roman Catholic gymnasium, a Reformed college, a mineralogical museum, and a public library. *Udvarhely* has 6000 inhabitants.

The country of the Saxons lies between Wallachia and the two preceding districts, occupying the central and southern parts of Transylvania. The smaller and separate district of Bistritz lies in the north-eastern corner of Transylvania, on the frontier of Bukowina. The country of the Saxons is divided into nine Jurisdictions and two districts.

The principal town of the country of the Saxons is *Hermannstadt*, the capital of Transylvania with regard to administration and finances; it is situated on the river Ziblin, a short distance north-west of the Alt, in the west part of the country of the Saxons, and is surrounded by most beautiful environs. It has upwards of 20,000 inhabitants. It consists of two parts: the upper town, situated on a hill with an old fortress, and the lower town, which lies at the foot of this hill: they are enclosed by a double wall. The market-place is very fine, and the streets are regular. The most remarkable buildings are—the Lutheran cathedral; the palace of Brückenthal, containing the gymnasium, a museum, a public library, a room with 18,000 medals, and a fine collection of antiquities, among which there are many Roman remains found in Transylvania; and the town-hall, an old gothic building of beautiful workmanship, which contains the archives of the Saxons. Among the public institutions the most remarkable are—two gymnasia, two national schools, two orphan-houses, an establishment for military education, five hospitals, a poorhouse and a workhouse. Hermannstadt is the residence of the Austrian commander-in-chief in Transylvania, and of a Greek bishop. The inhabitants manufacture cloth, horncombs, leather, some paper, and gunpowder. The village of *Heltau* near Hermannstadt is renowned for the gigantic size of its inhabitants. CRONSTADT. *Schässburg* (Segesvar), on the Great Kockel or Küküllo, in a beautiful valley, with 6000 inhabitants, has manufactories of cotton and cloth; wine is made in the environs. *Bistritz* (Besztercz), on the river Bistritz, opposite to the Borgo Pass, has 5000 inhabitants, who manufacture cloth, leather, and soap, and trade with Bukowina, Austrian Poland, and Moldavia.

A narrow tract of Transylvania along the frontier of Moldavia and Wallachia belongs to the Austrian military frontier, and has a separate administration with regard to military affairs. It has an area of 2212 square miles, and a population of 181,973, out of which are furnished 2 regiments of Szeklers, 2 of Wallaks, and a regiment of Szekler hussars.

TRAP. In modern works on topographical geology a very great proportion of the ancient rocks of fusion are familiarly called Trap, not because they have any certain mineral composition, but because, whether granitic, sienitic, porphyritic, or hornblendic, they appear under particular relations of position or geological age. In this sense the term is purely geological, and we have as distinctive designations 'eruptive trap,' 'contemporaneous trap,' 'overlying trap,' 'interposed trap,' &c. By other writers the term is restricted so as to leave out such massive and generally deep-seated rocks as granite, or even contracted to the hornblendic and felspatho-hornblendic rocks, which appear as dykes, interposed beds, and overlying masses. It thus appears to be a collective term more convenient than precise.

TRAPA, a genus of plants of the natural family of *Onagrariæ*, but sometimes appended to the *Halorageæ*, sometimes formed into a distinct order *Hydrocaryes*, Water-Nuts. The fruit of *Trapa* is furnished with spines, and the species are commonly called Water-Caltrops, from the plants floating on the surface of lakes, and on that of slow-running waters. They are found in the temperate parts of Europe and of Siberia, in Cashmere, India, Cochin-China, and China.

These small plants are of much more importance than many which are more conspicuous or better known, from the large seeds of all consisting of pure edible fecula. *Trapa natans*, the European species, is remarkable for its fruit with

four spines, being of a blackish colour and large size, and its seed, which nearly fills it, being farinaceous, and good to eat, whether raw, roasted, or in soups, and is somewhat like a chestnut in taste. It was known to the Romans by the name of Tribulus.

The Indian and Chinese species have each only two spines. The former is the *Trapa bispinosa*. In India the nuts are sold in all the bazaars, as their farinaceous kernels are much esteemed by the Hindoos. A species called in Hindustan *Singara* forms a considerable portion of the food of the inhabitants of Cashmere, where it has the same name. The Chinese species, *Trapa bicornis*, is carefully cultivated in lakes, ponds, and other receptacles of water.

TRAPANI, a province comprising the western extremity of Sicily, is bounded N.E. by the province of Palermo, and S.E. by that of Girgenti, from which it is separated by the river Belice. The area is 1358 square miles, and the population in 1845 was 182,809, including the inhabitants of the small islands along the coast. The province is divided into three districts, Trapani, Mazzara, and Alcamo; and it includes several considerable towns besides Trapani:—*Mazzara*, a bishop's see, and the residence of Count Roger, the Norman conqueror of Sicily, is on the sea-coast, has 8000 inhabitants, several churches and convents, a castle, and some trade in agricultural produce. MARSALA. *Castel Vetrano*, about 12 miles E. from Mazzara, inland, is an old-looking town, built on a hill, in a fertile country, producing good wine and oil, and abounding with cattle. It has several churches and convents, an old castle, several palaces, and 14,000 inhabitants. Six miles S. of Castel Vetrano, on the sea-coast, are the ruins of the ancient Selinus. About 8 miles N. of Castel Vetrano, on a hill, is *Salemi*, a town of 12,000 inhabitants, with a suburb called Rabat. East of Salemi, in the mountains, is *Gibellina*, with a castle and 5000 inhabitants. Farther N. is *Calatafimi*, a town of 10,000 inhabitants, with several fine churches. The best cheese in Sicily is made in its territory. ALCAMO. A few miles W. of Alcamo are the ruins of Segesta. On the neighbouring sea-coast is the small town of *Castellamare*, with a fortress, and about 4000 inhabitants, who carry on some trade by sea. *Partanna*, an inland town E. of Castel Vetrano, has about 10,000 inhabitants. Near Trapani is the town of *San Giuliano*, on Mount Eryx, with about 9000 inhabitants.

TRA'PANI, a town on the N.W. coast of Sicily, built on the site of the ancient Drépanum, on a point of land projecting into the sea, and facing the island of Levanzo, which is 10 miles W. of it. Drepanum was a place of traffic from the oldest times on record; there are however no remains of antiquity at Trapani. The harbour is formed by an inlet of the sea between the promontory and the mainland, protected on the west by an isolated rock, surmounted by an ancient fort, but open to the libeccio, or south-west wind, which is most dangerous on this coast. Trapani is one of the principal ports of Sicily; it carries on a considerable trade in salt, made by evaporation from sea-water, tunny fish, coral fished up along the coast of Barbary and worked in the town, anchovies, sulphur, and sumach. The seamen of Trapani are among the best in Sicily. Trapani has a collegiate church, numerous other churches and convents, a handsome town-hall, several palaces of the nobility, a royal college, an orphan asylum, several hospitals, and a population of about 24,000. The town is enclosed by walls, and is defended by a fortress. The streets are wide and well paved with flag-stones.

TRAPESUS. [TREBIZOND.]

TRAPE'ZIUM, TRAPEZOID. The first word (τραπέζιον, a little table) is used by Euclid for any four-sided figure which is not a parallelogram. The second word, formed from the first, has been used by various writers, and in different senses.

TRAPP, JOSEPH, D.D., was born at Cherrington in Gloucestershire, in Nov. 1679. He was entered at Wadham College, Oxford, in 1695, took his degree of M.A. in 1702, and was chosen a Fellow of his college in 1704. In 1708 he was appointed the first professor of poetry at Oxford, and he afterwards published his lectures under the title of 'Prælectiones Poeticæ,' 3 vols. 8vo., 1718. Dr. Trapp acted as manager for Dr. Sacheverell on his trial in 1710. He was afterwards chaplain to Lord Bolingbroke, and wrote several papers in the 'Examiner' in defence of his administration. He obtained the living of Dauntsey in Wiltshire in 1720, but resigned it in 1721, upon obtaining the vicarage of the united parishes of Christ Church, Newgate Street, and St. Leonard's, Foster Lane, London. In 1733 he was presented to the living of Harlington in Middlesex, and in 1734 was elected one of the joint lecturers of St. Martin's-in-the-Fields. He died Nov. 22, 1747.

One of his best works is said to be 'Notes upon the Gospels,' first published in 1747. His translation of Virgil into blank verse, published in 1717, in 2 vols. 4to., is a complete failure as a work of art.

TRAPPE, LA, *the Abbey of*, was founded in 1140 by Rotrou, comte du Perche. It is situated in a secluded valley, about three leagues N.E. from Mortagne, and as many S.W. from Aigle, in the department of Orne. Towards the close of the 15th century, the abbey was given to be held *in commendam*, and from that time its domains were neglected and mismanaged, the discipline of the monks relaxed, and they led a dissolute and disreputable life.

Affairs were in this state, when in 1636 the abbey was bestowed upon Armand Jean le Bouthillier de Rancy. De Rancy was born at Paris in 1626. He distinguished himself in letters at an early age. Soon after taking the slight vows which bound an abbé, he was appointed almoner to Gaston, duke of Orleans. The warm temperament which had developed his precocious talents, prompted him to plunge deeply into the voluptuousness of the court.

In the midst however of his intrigues and flattering successes, a sudden change came over the Abbé. At the age of thirty-four he found

himself converted; and having resigned all his benefices except La Trappe, he attempted to re-establish the old discipline of that order, but without success. At length, after many struggles, a concordat was arranged between the Abbé de Rancy and the old monks (Aug. 17, 1662), in virtue of which they evacuated the premises, which were immediately taken possession of by the brethren of the Strict Observance.

His zeal and eloquence soon had its influence upon his associates. The community devoted themselves to the observance of strict silence, to hard labour, to total abstinence from wine, eggs, fish, and all seasoning of their simple diet of bread and vegetables. Such was the reputation acquired by De Rancy, that his advice was in request not only at the councils of his order, but even at the court of Rome. In 1686 De Rancy resigned his office of superior. He died Oct. 27, 1700.

The reputation which the abbey acquired under the author of the new reform continued undiminished till the Revolution.

The Trappists having been involved in the common suppression of the religious orders, only four or five availed themselves of the opportunity of returning to the world. The rest found a refuge in a valley of the Swiss canton of Friburg, which they named Val-Sainte. Bonaparte showed, on his first accession to power, an inclination to patronise them, but an ultimate dispute with them, led him in 1811 to proscribe the whole order. After the restoration of the Bourbons, the Trappists were allowed to return to France. They purchased the site of their dilapidated monastery and some of the adjoining fields. In addition to the parent establishment, a number of the Trappists who had emigrated to America and England, returned, and settled in two or three other places in France. The original monastery of La Trappe is called, by way of distinction, La Grande Trappe du Perche.

TRAS-OS-MONTES, a province of Portugal, bounded N. and E. by Spain, S. by the province of Beira, and W. by that of Minho, lies between 41° 4′ and 41° 57′ N. lat., 6° 10′ and 8° 0′ W. long.; it is 80 miles long from E. to W. and 55 from N. to S.; the area is 4011 square miles; and the population in 1841 was 300,840. The surface is hilly and dry with the exception of the river valleys, which are highly cultivated and produce abundantly wheat, maize, rye, beans, and all kinds of fruits. In places sheltered from the north wind the olive and mulberry are extensively planted, and much oil and silk are produced. On the banks of the rivers, and especially along the right bank of the Douro, which forms the boundary on the E. and S., the vine is the great object of the farmer's care for the production of port wines. Cattle, horses, sheep, and pigs are numerous; the pigs are fattened on chestnuts. Some silk and linen are the only manufactures. Wine is the chief export. The province is drained by the Douro, and its feeders the Sabor, the Tua, the Corgo, and the Tameja, and is divided into two districts, Villareal and Bragança, named from its two chief towns. *Villareal*, the most commercial town of the province, is situated on the Corgo, 60 miles S.W. from Bragança, and has 2 churches, 3 convents, a hospital, and about 4500 inhabitants. *Bragança*, the capital of the province, and the original seat of the royal house of Portugal, stands in a fertile plain on the Fervenza, a feeder of the Sabor, and has 4000 inhabitants, who manufacture taffeta and velvet. The city, which is partially fortified and defended by a citadel, is the residence of the bishop of Bragança and Miranda, and has 2 churches and a college. *Miranda-de-Douro*, 25 miles S.E. from Bragança, stands on the right bank of the Douro, and has about 5000 inhabitants. It is surrounded by old fortifications, and has an ecclesiastical college and 2 hospitals. The city formerly gave title to a bishop, whose see is now united to that of Bragança. *Peizo-da-Regoa*, a small village of about 2000 inhabitants on the right bank of the Douro, in the south-west of the province, deserves notice for its wine-fairs and stores. Here the Upper-Douro Wine Company makes it purchases, sorts the wines, and fixes the price. *Torre-de-Moncorvo*, a small town of under 2000 inhabitants, surrounded by a bastioned wall and defended by a castle, stands on the slope of the Sierra Roberedo, between the Sabor and the Douro, and has some trade in silk, flax, and hemp.

TRAU. [DALMATIA.]

TRAVANCORE. [HINDUSTAN, vii. 192.]

TRAVEMÜNDE. [LUBECK.]

TRAVERS, JOHN, was educated first in St. George's Chapel, Windsor, and afterwards under the celebrated Dr. Greene. In 1737 he was appointed organist to the Chapels Royal. He died in 1758. Travers was the author of the highly popular glees, 'Haste, my Nanette;' 'I, my dear, was born today;' 'When Bibo thought fit;' 'Soft Cupid,' and of much cathedral music.

TRAVERSE, in Law, is a contradiction of some matter of fact alleged in pleading by the opposite party. It ought to be by express words, and not argumentatively. Generally all matter of fact that is material ought to be either confessed and avoided, or traversed; and if a party justifies an act as to one particular time and place, or confesses and avoids in one respect, he ought to traverse it as to all other. Otherwise what is materially alleged will be taken to be admitted.

In criminal pleading traverse of an indictment is the taking issue and denying some material point in it. Not guilty is a general traverse, which throws on the prosecutor the necessity of proving all the material facts.

TRAVERSE TABLE, a table used in navigation, in what is called Traverse Sailing, which is merely the sailing on different points of the compass, for short distances, in succession. It is a table of double entry in which with the angle of the course and the distance run by the ship, as arguments, there are found in two columns the corresponding departure and the difference of latitude; these being the two sides of a right-angled triangle, of which the distance is the hypothenuse. The spherical Traverse Table in Raper's 'Navigation,' serves to facilitate the determination of an angle of a spherical triangle when the three sides are given.

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TRAVERSES, in Fortification, are usually masses of earth which are raised at intervals across the terreplein of a rampart or across the covered-way of a fortress: their positions in the covered-way are indicated at *t*, *t*, &c. [FORTIFICATION.] On a rampart they serve to protect the guns and men against the effects of a ricocheting or enfilading fire, which might otherwise dismount the former, and compel the latter to abandon the parapet: and in the covered-way, besides serving for similar purposes, they constitute retrenchments behind which the defenders may keep up an annoying fire of musketry upon the enemy, should the latter attempt to force his way along the branches of that work. On this account they are provided with banquettes, or steps, on which the defenders may stand to fire over them. Bousmard proposes that, in the covered-way, they should have the form of redans, and that, in the thickness of each face there should be a small gallery with loop-holes, through which, as well as over the top of the traverse, a fire of musketry may be made.

TRAVERTIN, the Italian term for concretionary limestone produced from springs holding carbonate of lime in solution. A large proportion of the most splendid edifices of ancient and modern Rome are built of travertin derived from the quarries of Ponte Leucano.

TREACLE. [MOLASSES.]

TREASON is derived from the French *trahison;* and in conformity with this derivation, the offences designated by it in English law always contained the notion of treachery, or a breach of that allegiance supposed to be due from an inferior to a superior. Thus petit-treason was the murder of a husband by his wife, or a master by his servant, or a bishop by his subordinate in the church; and high treason consists in an attack upon the king as the political head of the state. The former of these two kinds of treason was abolished by 9 Geo. IV., c. 31, s. 2, which enacts that every offence, which, before that act, would have amounted to petit-treason, should be deemed to be murder only, and no greater offence. The only treason therefore which can now exist is high treason.

Originally the notion of high treason was very vague. The first intelligible definition of it was given by the Statute of Treasons (25 Edw. III., st. 5, c. 2), which is still the chief law on the subject. The following acts are treasons according to this statute:—Compassing the death of the king (which term includes a queen regnant), or of his queen, or their eldest son and heir; violating the king's companion (that is, his wife), during the marriage, or the king's eldest daughter unmarried, or the wife of the king's eldest son and heir; levying war against the king in his realm, and being adherent to the king's enemies in his realm, giving them aid and comfort in the realm or elsewhere, and being thereof attainted of open deed; or slaying the chancellor, treasurer, or the king's justices of the one bench or the other; justices in eyre or justices of assize, or any other justices assigned to hear and determine in their places during their offices. The words of this statute, 'compassing and imagining,' were by the interpretation of the courts made to comprehend cases to which the words do not directly apply, and this was called 'constructive treason.'

The doctrine of constructive treason having been brought into prominent notice and much discussed in the trials of Hardy, Horne Tooke, and others, in 1794, the statute 36 Geo. III., c. 7, was passed with a view of superseding the necessity of resorting to any such modes of interpretation for the future. This statute, which, although originally in force only for the life of Geo. III., was made perpetual by the statute 57 Geo. III., c. 6, enacted that 'if any person shall, within the realm or without, compass, imagine, invent, devise, or intend death or destruction, or any bodily harm tending to death or destruction, maim or wounding, imprisonment, or restraint of the person, of the king, or to deprive or depose him from the style, honour, or kingly name of the imperial crown of this realm, or of any other of his Majesty's dominions or countries, or to levy war against his Majesty within this realm, in order by force or constraint to compel him to change his measures or councils, or in order to put any force or constraint upon, or to intimidate or overawe both Houses or either House of Parliament, or to move or stir any foreigner or stranger with force to invade this realm, or any other of his Majesty's dominions or countries under the obeisance of his Majesty; and such compassings, imaginations, inventions, devices, and intentions, or any of them, shall express, utter, or declare, by publishing and printing or writing, or by any overt act or deed, every such offender, being legally convicted upon the oath of two lawful and credible witnesses, shall be adjudged a traitor, and suffer, as in cases of high treason.' It was no doubt the intention of the legislature that this statute should put an end to all artificial constructions of the statute of Edward III.; nevertheless the practice of resorting to these forced interpretations has been continued, and sanctioned by the judges in several subsequent prosecutions for high treason. ('Sixth Report of Commissioners on Criminal Law,' p. 16.)

The clause in the Statute of Treasons which declares the offence of counterfeiting the king's coin to be high treason has been repealed by the statute 2 Wm. IV., c. 34; and the crime itself has been by the same enactment divided into distinct classes of felonies and misdemeanors, with a graduated scale of punishments.

The following are also high treasons:—Endeavouring to prevent the person next in succession to the crown according to the Acts of Settlement, from succeeding thereto (1 Anne, st. 2, c. 17, s. 3). Affirming by writing or printing that any other person has a right to the crown otherwise than according to the Acts of Settlement and the Acts for the Union of England and Scotland; or that the crown, with the authority of parliament, is unable to limit the descent of the crown (6 Anne, c. 7, s. 1). Being married to or being concerned in procuring the marriage of any issue of her present Majesty, whilst such issue are under eighteen (in case the crown shall have descended

to any such before that age), without the consent in writing of the regent and the assent of both Houses of Parliament (3 & 4 Vict., c. 52, s. 4). Knowing any person to have committed any of the before-mentioned treasons, receiving, relieving, comforting, or assisting or aiding his escape from custody.

The forfeitures consequent upon conviction for high treason, and the judgment pronounced by the court, are stated in the article LAW, CRIMINAL, vii. 881, 882.

TREASURE-TROVE, in legal Latin called *thesaurus inventus*, is a branch of the revenue of the crown of England, and belongs to the king or his grantees. If coin, plate, or precious metals are found hidden in the earth or any private place, and the owner or person who deposited them is unknown, the property belongs to the king. But if the owner is known, or is ascertained after the treasure is found, the property belongs to him. By a constitution of Hadrian ('Inst.' i., tit. i., s. 39), if a man found treasure (*thesauri*) in his own ground, it belonged to the finder, and also if he found it in a place which was sacer (sacred to the gods above), or religious (sacred to the Dii Manes). If a man found treasure accidentally in another man's ground, the constitution gave half to the finder, and half to the owner of the ground. If he found treasure in the ground of the emperor, the finder had half, and the emperor half; and the law was the same if the ground belonged to the fiscus, or to the Roman people, or to any civic community. The law of England adopts the Roman definition of treasure-trove of Paulus ('Dig.' 41, tit. i. s. 31). 'Treasure (thesaurus) is an ancient deposit of money, of which there is no record so as to give it an owner: for thus it becomes his who has found it, because it does not belong to another;' and to entitle the crown to the property, it must appear to have been hidden or deposited by some one who at the time had the intention of reclaiming it. Whenever therefore the intention to abandon appears from the circumstances—as for instance, where the property has been found in the sea, or in a pond or river, or even openly placed upon the surface of the earth—it belongs to the finder. In England the concealment of treasure-trove from the king was apparently formerly a capital offence; at present it is a misdemeanor punishable by fine and imprisonment.

TREASURY, a department of the British government which controls the management, collection, and expenditure of the public revenue. It is the business of another department, the Exchequer, to take care that no issues of public money are made by the Treasury without their being in conformity with the authority specially enacted by parliament. When money is to be paid on account of the public service, this is almost always done on the authority of a Treasury warrant; and in other cases the countersign of the Treasury is requisite. The Board of Treasury consists of the prime minister and the chancellor of the exchequer. The real office which the premier holds is generally that of First Lord of The Treasury. There are also four junior lords, who have usually seats in parliament, as have also the two joint secretaries of the Treasury. The departments immediately subordinate to the Treasury are the boards of customs, of excise, of stamps and taxes, and the post-office, the various officers in which are to a great extent appointed by the Lords of the Treasury; and this constitutes an important part of the patronage of the ministry. The offices of the Treasury are in Whitehall. The amount paid in salaries of 1000*l.* and upwards, is about 30,000*l.* a year. The First Lord of the Treasury receives 5000*l.* a year; two secretaries of the Treasury receive 2500*l.* a year each, and the assistant-secretary 2000*l.* a year; the solicitor of the Treasury receives 2850*l.* a year; four commisioners of the Treasury receive 1200*l.* a year each; and other officers receive sums varying from 1000*l.* to 1500*l.* each. The amount paid in salaries below 1000*l.* we have no means of ascertaining.

TREATY (from the French *traité*) means literally that which has been drawn up, or, in other words, arranged and agreed upon, by two or more parties, who are accordingly called the contracting parties.

Although a treaty is commonly defined to be an agreement made with one another by two or more governments, it is not necessary that every party to a treaty should always be a sovereign power or an independent political society. The English East India Company has the power, and has repeatedly exercised it, of making treaties under certain limitations. But in all such cases this power must be given by the supreme authority in the state to which the contracting party belongs, or, which is the same thing, by the constitution or political system of which it is a member. Treaties then can only be made by sovereign powers, or by parties upon whom the sovereign power has conferred that right. In our constitution, for example, where the sovereign power consists of the king and the parliament, the power of concluding treaties with foreign powers generally belongs to the king, and is exercised by his ministers or those to whom he delegates the power.

A treaty is only in force so long as the contracting parties choose to observe it; for as the contracting parties are sovereign powers, there is no superior authority to enforce the observance of the treaty. Respect for opinion and fear of other powers interfering, and various other motives, may often combine to ensure the due execution of treaties, when the parties to them are not disposed to observe them.

Treaties between nations for mutual commercial advantages have often been made, but the small value of such treaties is now pretty well understood. Such treaties are cumbrous expedients for effecting what may generally be done better by the nation—which has most to give and is able to take most—relaxing its own restrictive laws; which is what Great Britain is doing now.

A complete account of the printed collections of treaties is contained in the 'Discours Préliminaire sur les différens Recueils de Traités publiés jusqu'à ce Jour' (pp. 3–73), in the first volume of the 'Supplément au Recueil des principaux Traités,' &c., by De Martens, 8vo., Göttingen, 1802. All preceding general collections are superseded by the

great work of Du Mont and Rousset, entitled 'Corps Universel Diplomatique du Droit des Gens, contenant un Recueil des Traités d'Alliance, &c., depuis le Règne de l'Empereur Charlemagne jusques à present,' &c., &c. The original work is in eight volumes, to which there is a supplement in five volumes, which appeared in 1739.

The collection of Du Mont and Rousset has been completed and brought down to the present day by the late George Frederic de Martens, professor of the Law of Nature and Nations at Göttingen, and his successors, in their work entitled 'Recueil des Traités d'Alliance,' &c., the first volume of which, in 8vo., was published at Göttingen in 1790. Various supplements have been since published. The original work of De Martens consists of seven volumes.

There are separate collections of treaties published in nearly all the countries of Europe, consisting for the most part of those treaties to which the country has been a party, and which therefore form the history of its connection with foreign states. Most of those collections also De Martens has enumerated in the discourse already referred to. The most important of English collections is that entitled 'Thomæ Rymeri Fœdera, Conventiones, Litteræ' &c., in 20 volumes, folio, 1704–1735. It includes the period from A.D. 1101 to 1654. A second edition of the first 17 volumes (the last of which is occupied with an index to those that precede) was published at London, under the care of George Holmes in 1727; a third, including the whole 20 volumes in 10, and with considerable additions and improvements, was brought out at the Hague in 1739; and a fourth, augmented by many new documents, has been in part printed under the direction of the late Record Commission. Various collections have been published since that of Rymer. The latest general collection of treaties which has appeared in this country is by George Chalmers, 2 vols. 8vo., London, 1790, which is a useful work. The new treaties and other state papers are annually published by the Foreign Office; and there is a very convenient work, entitled 'A Complete Collection of Treaties, &c., at present subsisting between Great Britain and Foreign Powers, so far as they relate to Commerce and Navigation, to the repression and abolition of the Slave Trade, and to the Privileges and Interests of the Subjects of the high Contracting Parties,' compiled from authentic documents by Lewis Hertzlet, Esq., librarian and keeper of the papers, Foreign Office, 5 vols. 8vo., London, 1840.

TREBBIA. [HANNIBAL, vi. 1015; PO.]

TREBIZOND, *Trapesus*, an ancient town, situated on the Pontus Euxinus, in the eastern corner of Asia Minor. Trebizond was a colony of Sinope, a town founded by the Milesians. Xenophon with his 10,000 Greeks came to Trebizond in his retreat ('Anabasis.' iv., 8), and remained there thirty days. In the war with Mithridates the Romans took Trebizond, which henceforth belonged to the Roman Empire, and became a large and opulent city. Hadrian ordered the port to be secured by a mole. During the reign of Valerian (A.D. 253–259) Trebizond was taken, and partly destroyed by Scythian barbarians, and fell into great decay till the reign of Justinian, who ordered the public buildings to be restored. The town afterwards became the capital of a province which contained the ancient country of Pontus. In the middle ages the Genoese constructed a mole in the port of Trebizond, which is now almost entirely destroyed. At present Trebizond is the capital of the Turkish eyalet of Trebizond, the seat of the pasha of the province and of a Greek archbishop, and has a population variously stated at from 15,000 to 50,000, consisting of Mohammedans, Armenians, Greeks, and Christians. The Christians live without the walls. When Tournefort visited the town, the population was scanty, and extensive gardens and fields were contained within the walls. Among the public buildings the most remarkable are, the castle or citadel, partly of ancient partly of modern construction, situated in the middle of the town on a steep rock, the summit of which is as flat as a table (τράπεζα, thence the name of the town); the bazar; public bath-houses of marble; and the ruins of a temple of Apollo, part of which has been converted into a Greek chapel. The commerce of Trebizond has much increased since the navigation of the Black Sea was opened to all nations, and especially since the establishment of steamers, by which this town has a direct and regular communication with Constantinople, Odessa, and the Danube. The number of sailing vessels engaged in the commerce of the port in 1849 was 87; and a large trade is carried on by steamers, of which 23 English, 30 Turkish, and 24 Austrian, entered the port in the course of the same year. The entire value of the imports was 53,409,215 francs; the exports amounted to 14,251,406 francs, being an increase on 1848, when the exports amounted to only 6,239,790 francs. The imports show a decrease on those of 1848 caused by the cheaper and safer means of transit to Persia by the Russian port of Redut Kalé and Tiflis. The increase in the exports is chiefly owing to the larger quantity of Turkish copper and other produce, and of Persian silks, gall nuts, &c., shipped to Europe from this port. The chief imports are cotton manufactures, sugar, coffee, and other colonial produce. The Austrian Steamboat Company plies regularly between Trieste and Trebizond, and has lately extended its line to Batoom and Redut Kalé, to which latter place Russia aims at diverting the Persian trade, from the old route through Trebizond, Erzeroum, and Bayazid.

TRECATE. [NOVARA.]

TREDGOLD, THOMAS, was born at Brandon, near Durham; but when is not ascertained. He was apprenticed to a carpenter in his native village, and worked for five years at the trade in Scotland as a journeyman. He then removed to London, where he obtained employment in the office of an architect, in which he remained for ten years. During that time he employed his leisure in study, and thus prepared himself for the production of the scientific treatises to which he owes his principal reputation. Of these the following are the prin-

cipal :—'Elementary Principles of Carpentry,' 1820; 'A Practical Essay on the Strength of Cast-Iron, 1822; 'Principles of Warming and Ventilating Public Buildings,' &c., 1824 (second edition); 'A Practical Treatise on Railroads and Carriages,' 1825; 'Remarks on Steam Navigation,' &c., 1825. The last important work published by Tredgold was 'The Steam-Engine,' 1827, and 1838. Tredgold was also the author of several valuable articles in the 'Encyclopædia Britannica.'. He died in 1834.

TREE, COTTON. Two very distinct plants are confounded under this name. One is a true Cotton-Plant, the *Gossypium arboreum* of botanists, and the *Nurma* of the natives of India. The other is a species of *Bombyx*, or rather several species are called Cotton-Trees by travellers, from the capsules containing within them a silk-like substance, which has some resemblance to cotton, but none of the useful properties of cotton for spinning, and is therefore only used for stuffing beds and pillows.

TREE-CREEPER. [Creeper.]

TREES. The vegetable kingdom is frequently distributed into herbs, shrubs, and trees; and such a division constituted the basis of its classification by many of the older botanists. Herbs are plants whose stems live only for a single year. Shrubs have perennial stems, but have no trunk. Trees are distinguished by possessing a trunk of varying size, from which spring a number of branches having a structure similar to the trunk. The classification of plants that would place trees all together is not a natural one, as it is making size a criterion of resemblance. In the most recent systems of classification, as those of Jussieu, De Candolle, and others, trees are found in all the principal classes. Thus amongst Exogens there are numerous examples, as the oak, elm, lime, &c.; amongst Endogens the palms; and even amongst Acrogens the tree-ferns. In the orders, trees, shrubs, and herbs, frequently occur together, and even in some genera. Instances also occur of particular species being herbs in one country and shrubs in another, as the common mignionette. The division therefore of plants into trees, shrubs, and herbs, though convenient for practical purposes, and sanctioned by long usage, is not founded upon any essential difference in the character of the plants.

For practical purposes trees are divided into several kinds. Standard-trees, or standards, are those which are allowed to grow naturally to a great height without topping. Dwarf-trees are those which are not allowed to have more than one or two feet of trunk, being kept thus low by taking off the primary bud and allowing the collateral buds to develop. Forest-trees are those which are grown in large quantities for the purpose of affording timber. They have tall straight trunks and abundant foliage, and embrace all the large trees, as the oak, the beech, the elm, the pine, &c., that naturally grow together in large masses. Fruit-trees are such as bear edible fruits of various kinds, and are cultivated in orchards and gardens, such as the apple, pear, plum, cherry, &c. Wall-trees are those whose branches are extended against walls. They are mostly fruit-bearing trees, as the peach, plum, apple, &c.; sometimes however, for the sake of protection and ornament, trees whose fruit is valueless are planted against a wall.

Trees frequently attain a great age, of which several remarkable instances have been recorded. [Age of Trees.]

For further information on the subject of trees the reader should consult Loudon's 'Arboretum et Fruticetum Britannicum,' and Selby's 'British Forest-Trees.'

TREFOIL. [Trifolium.]

TREGONY. [Cornwall.]

TRÉGUIER. [Côtes-du-Nord.]

TREIGNAC. [Corrèze.]

TREMADOC. [Cornwall.]

TREMANDRA'CEÆ, a natural order of plants belonging to the syncarpous group of polypetalous Exogens. This order consists of slender shrubs very much resembling heaths, and contains only two genera, *Tetratheca* and *Tremandra*.

TREMELLA. [Tremellini.]

TREMELLI'NI, the name of the last order of the cohort *Hymenomycetes*, in Fries's arrangement of the natural order *Fungi*. The type of this order is the *Tremella*, a genus constituted by Dillenius, and applied to a variety of forms of Fungi belonging to this group, but now arranged under other genera. The *Tremellæ* of Dillenius included all kinds of the lower forms of plants which possessed a gelatinous character; and as these exhibited a tremulous motion on being shaken, he gave them this name.

The plants of this order are known by their amorphous character, having a soft gelatinous appearance, and looking like gummy exudations of the substances on which they grow.

T. fimbriata, Fringed Tremella, has a violet colour when young. When boiled in water the plant does not lose its shape or colour, but yields a deep brown infusion, which might be made useful in dyeing. *T. mesenterica*, Orange Tremella, or Yellow Nostoc, is known by its orange-yellow colour. This is one of the most common of the species, and is found all the year round on decaying branches and sticks, and on the stumps of trees. *T. albida*, Whitish Tremella, is found on fallen trees, branches, &c., in winter and spring.

The genus *Exidia* is known by possessing a gelatinous, homogeneous receptacle, covered above only with a papillate hymenium. The most remarkable species of this genus is the *Exidia Auricula Judæ*, Jew's Ear. It has obtained its common name from its resemblance whilst growing to a human ear. *Exidia glandulosa*, Glandular Exidia, or Witches' Butter, is an effused mass, thick and undulated, varying from a whitish-brown to a black colour. It is frequently found in autumn and winter on trunks and branches of trees, especially the ash.

The genus *Dacrymyces*, sometimes called Tear-Mould, yields species which attack wrought wood, and produce what is called dry-rot. The *D. moriformis*, Mulberry Tear-Mould, is of a rich deep purple colour, and is found on wrought wood in a clustered rounded form resembling a mulberry.

The *D. violaceus*, Violet Tear-Mould, has a violet-black colour, and is found on the trunks of pear and apple trees, resembling very much the crust of port wine. *D. stillatus*, Common Tear-Mould, has a yellowish orange colour, and is found most frequently in the wood of firs.

There are three other genera belonging to the order Tremellini — *Nœmatelia*, *Agyrium*, and *Hymenula*, each of which have one species.

TRE'MITI ISLANDS, a group of three small islands in the Adriatic, belonging to the kingdom of Naples, lie N.W. of Monte Gargano, and about 16 miles N.N.E. from the mouth of the Fortore, the ancient Frento. The islands are separated by channels about half a mile wide, and are called San Domino, San Nicola, and Capperara, the last of which is a mere uninhabited rock abounding with capers. The Tremiti islands form part of the administrative province of Capitanata, and on one of them, San Nicola, called also Tremiti, is a strong fortress with a garrison. This island is about three miles round, and consists of a lofty rock which is steep towards the sea. The adjacent island of San Domino is between 5 and 6 miles in circumference, and is more accessible and more productive, especially of oil and fruit of various sorts. These islands were called by the ancients Diomedeæ, from a tradition that Diomédes was buried in one of them. The vast and splendid monastery and church built on the isle of San Nicola by the Augustinian monks in the 15th century, and surrounded by strong bastioned walls, now forms the fortress of Tremiti, which is used by the Neapolitan government as a prison. The fortifications were so strong as to enable the monks to resist the attack of a formidable Turkish fleet in 1567. (Cocarella, *Cronica Istoriale di Tremiti*, Venice, 1606.)

TRENCH, in military works, is an excavation in the ground from 12 to 18 feet wide and 3 feet deep, and generally of considerable length, the earth being thrown up on one side in order to form a sort of parapet by which the soldiers in the trench may be covered from the view or protected from the fire of the enemy. [Sap; Siege.]

TRENT, or TRENTO. [Tyrol.]

TRENT, COUNCIL OF. [Councils.]

TRENTO, ANTONIO DA, is supposed to be the same person as Antonio Fantuzzi. He was born at Trent about the commencement of the 16th century; and was, according to Vasari, the pupil of Parmigiano, who employed him to engrave his works on wood. About 1530 Antonio went, it is supposed, to France, under the name of Antonio da Trento, and etched some plates for Primaticcio. He executed also etchings after some other masters while in France. Bartsch describes 37 etchings by him, but he is more celebrated for his woodcuts. His death happened probably about 1550.

TRENTON. [New Jersey.]

TRENTSIN. [Hungary.]

TREPHINE is a kind of saw employed in surgery for the removal of a circular portion of bone. For this purpose it is used in various cases, such as diseases requiring perforation of the antrum, necrosis with loose enclosed sequestra, abscesses in bone or under bones, &c.; but especially in injuries of the head and their various consequences, for which the removal of a portion of the skull is deemed necessary.

The use of the trephine is now much more rarely required than in former times; and this, not only because, since the time of Mr. Pott, surgeons have learned that it is beneficial in few injuries of the head beyond those in which there are distinct signs of compression of the brain, but also because, in many of the cases in which it is necessary to remove portions of bone, the instrument called Hey's Saw is far more convenient.

TRÉPORT. [Seine-Infe'rieure.]

TREPTOW. [Stettin.]

TRESPASS is a wrong directly done to the person, to the goods and chattels, or to the lands and tenements, of any man.

To the person it may be by menace, assault, battery, or maiming [Assault]; to either dead or live chattels, by taking them away or by injuring them; to lands and tenements, by entering upon them and injuring them. Trespass is the action by which a person in the actual and exclusive possession of property is protected against the forcible interference with it by those who are not entitled to it. By this action also he may recover damages for the injury done to his possession.

The possession which is sufficient to entitle a man to bring this action against a stranger is a bare possession without any proof of further title to the property; but the possession must be actual: an heir who is entitled to lands, but has never entered upon them, cannot bring this action. The possession also must be exclusive: one who has only a right of common cannot bring an action for trespass for an injury done to the common, since others have rights co-existent with his own. A tenant during the existence of his demise may maintain it against the landlord himself if he enters upon the premises except for a lawful cause, as to distrain. The mere possessor of goods or cattle may maintain trespass against a stranger. With respect to goods, possession may be said to be of two kinds, possession in fact, and possession in law, sometimes distinguished by the terms actual possession and constructive possession. Either kind is sufficient to enable the possessor to maintain trespass. It is a constructive possession if the property of goods has vested in a party, the mere property in such case being construed to draw after it and invest the owner with possession also.

To constitute trespass, the act done must be wilful, not the result of negligence, and have something of force in it, and the injury must be the immediate not the consequential result of the act. But it is not necessary that it should be done with the design to cause the injury complained of; it may be done in mistake or ignorance. If one shooting at a mark hits a bystander, he is guilty of trespass. A sheriff commits an act of trespass if he takes the goods or arrests the person of B, mistaking him for A. In trespass, all persons who assist in the act done, or cause it to be done, or, if it is for their use, assent to it afterwards, are considered as principals, although not actually present at the doing of the act. If an act is done by a

servant wilfully, and in the discharge of his business as servant, the master is liable for the act in trespass. But if it is wilful on the part of the servant, and not in discharge of his master's business, the master will not be liable unless by such assent as is above stated.

As to malicious injuries to property, see the Act 7 & 8 Geo. IV., c. 30.

TRETS. [BOUCHES-DU-RHÔNE.]

TREVES. [TRIER.]

TREVI'GI, a province of Austrian Italy, which formed part of the territory of the republic of Venice, is bounded N. by the province of Belluno, E. by Friuli, W. by the province of Vicenza, and S. by the provinces of Padua and Venice. The area is 928 square miles, and the population in 1842 was 276,347. Two-thirds of the province consist of a fine fertile plain; the other third, which lies N. of the town of Treviso, is hilly. The river Piave, coming from Belluno, crosses the province from N.W. to S.E. Farther E., in a direction nearly parallel to the Piave, flows the river Livenza. Both these rivers and also the Sile, which drains the southern part of the province, are navigable for large boats to the sea. The Sile communicates by canals with the lagunes of Venice. The principal productions of the province are corn, wine, fruit, wool, silk, cheese, and cattle. There are also manufactories of silks, woollens, and paper. Twelve miles N. of Treviso, where the hills begin to rise, is the forest of Montello, which supplies Venice with timber for ship-building. The principal towns of the province are—TREVIGI: *Asolo*, a very old decayed town, which contains 3400 inhabitants: *Castelfranco*, which has 3800 inhabitants, a handsome collegiate church, and considerable traffic: *Conegliano*, which also has 3500 inhabitants: *Ceneda*, a bishop's see, with 5000 inhabitants: *Oderzo*, an ancient but decayed town, 12 miles N.E. of Treviso, with about 3800 inhabitants: and *Porto Buffole*, on the Livenza, about 22 miles from the sea, population 3000.

(Rampoldi, *Corografia dell' Italia;* Verci, *Storia della Marca Trevigiana.*)

TREVI'GI, or TREVI'SO, a bishop's see, and the head town of the province of Trevigi, is situated in a fertile plain on the banks of the Sile. The town is old; the streets are irregular, mostly lined with arcades and adorned with several fine buildings. The cathedral, built first by the Longobards and afterwards restored but never finished, has some paintings by Veronese, Tiziano, and Bordone, and the relics of several saints. There are several other churches worthy of notice, as well as the episcopal palace, the town-house, the palaces of the families Pola, Brescia, and others. Treviso is surrounded by walls and a ditch, and has a circumference of about 3 miles. It has a spacious hospital, a Monte di Pietà, a public library, a handsome theatre, an academy of sciences and literature, and about 15,000 inhabitants, independently of the suburban parishes which contain about 6000. A great fair is held here in the month of October; it lasts a fortnight.

TREVI GI, or TREVI'SI, GIRO'LAMO DA, was born at Trevigi in 1508. He lived some time in Bologna, where he painted the story of Saint Antonio of Padua, in oil, in the cathedral. He attempted, not unsuccessfully, to combine the Venetian school with that of Raphael. After painting several works in fresco at Venice, Trent, and other places, he came to England and entered the service of Henry VIII., who employed him as architect and engineer. He was engaged in the capacity of engineer in the year 1544 before Boulogne, and was there killed by a cannon-shot.

TREVISA'NI, FRANCESCO, Cavaliere, was born at Capo d'Istria, near Trieste, in 1656. He acquired the first principles of design from his father, an architect. He became the scholar of Antonio Sanchi at Venice. After some preliminary practice as a painter in the Flemish school, he distinguished himself by several fine pictures. At Venice he won the affections of a noble young Venetian lady, with whom he eloped and married. At Rome, whither he had fled, Trevisani found a valuable patron in the Cardinal Flavio Chigi, who procured him the title of Cavaliere from Pope Alexander VII. Trevisani's works are numerous in Rome; he painted also for many other cities, and for foreign countries. He died in 1746.

His best pictures are a good deal in the manner of Guido; but he painted all subjects and in all styles. His chief excellence consisted in purity and brilliancy of colouring.

TREVOR, SIR JOHN, the second son of John Trevor, Esq., of Brynkinalt, in Denbighshire, and, by his mother, first cousin to Judge Jefferies, was born in 1633. He was educated for the law, and was recommended by Jefferies to be of the king's council, and master of the rolls in 1685. On the meeting of parliament in May, 1685, and again when a new parliament assembled, March 20, 1690, he was elected speaker of the House of Commons. In the beginning of 1688 he had been made a privy councillor, and he was afterwards one of the commissioners of the great seal. 'Being a Tory in principle,' says Burnet, 'he undertook to manage that party, provided he was furnished with such sums of money as might purchase some votes; and by him began the practice of buying off men, in which hitherto the king had kept to stricter rules.'

In the session of 1695 the corrupter of others was discovered to have been himself corrupted. It was proved that he had received a bribe of a thousand guineas from the city of London for his support of a bill in which the city was greatly interested. He was expelled from the house, and was obliged, as speaker, to put the question of expulsion himself from the chair. He however retained the mastership of the rolls, 'to the great encouragement,' as North remarks, 'of prudent bribery for ever after.' He died May 20, 1717, in London.

TREW, CHRISTOPH JACOB, was born at Lauffen, a small town in Franconia, near Nürnberg, April 26, 1695. Trew went in 1711 to Altdorf in order to attend the lectures of the faculty of medicine, and was admitted to the degree of doctor in 1716. He travelled in Germany, Switzerland, France, and Holland, and stayed for

a year at Danzig. In 1720 he returned to Lauffen, and became a member of the College of Physicians at Nürnberg. The margrave of Anspach granted him the title of physician-in-ordinary and counsellor to the court. He was admitted in 1742 as a member of the 'Académie des Curieux de la Nature,' and was raised in 1746 to the dignity of president, which at this time included the titles of count palatine, aulic counsellor, and physician to the emperor. He died June 18, 1769. Assisted by the excellent painter Ehret, he published the beginning of a magnificent work on botany, which was continued after his death by Vogel. He was the author of several other works on botany and medicine.

TREWCA'CEÆ, a natural order of plants belonging to the rectembryose group of incomplete Exogens. This order has for its type a single genus, *Trewia*, was named after Christoph Jacob Trew. The plants of this order are natives of tropical India, and their properties are at present unknown, nor is their structure well understood.

TRIAL, the means adopted for the purpose of ascertaining facts in issue in common law proceedings, whether civil or criminal. The equity courts have also the power, where they think it convenient, in the case of disputed facts, of directing an issue to be tried at common law. The kinds of trial are properly only two: 1, that where the court itself decides upon the evidence without the intervention of a jury; 2, that where the jury decides.

A peer of Great Britain indicted capitally is entitled to be tried by the peers of parliament assembled in the court of the Lord High Steward of Great Britain, who is a peer nominated to that office by the crown for the occasion. The proceedings of the trial are carried on in the same way as on a trial by jury, and judgment is pronounced according to the opinion of the majority, which must consist of at least twelve. Cases of impeachment by the Commons are also tried by the Lords.

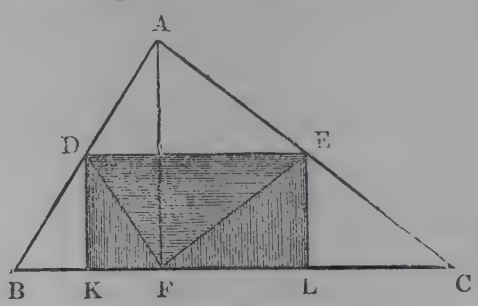
A Trial at Bar resembles the ordinary cases of trials by jury, except that instead of its being presided over by a single judge, all the judges of the court in which the action is brought are in attendance. It is granted on application to the court, but only in cases of great difficulty and importance. In informations exhibited by the attorney-general, as law-officer of the crown, he is entitled to a trial at bar.

New Trial. After a trial has been already had, it is competent to the court in which the action is brought to grant a new trial, on an application made, and grounds shown for supposing that justice has not been done between the parties; and that the case is of sufficient importance to warrant such a further expense. These grounds are various, such as a misdirection by the judge, a verdict against evidence, excessive damages, &c.

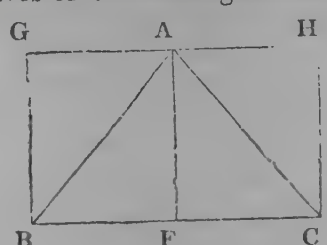
TRIANGLE, a figure having three angles, and consequently three sides. This consequence is usually made the definition; and the same thing occurs in Euclid, whose word is τρίγωνον in the 'Elements, though it is τρίπλευρον in the definitions prefixed.

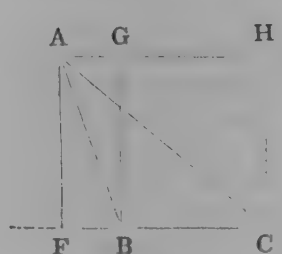
A triangle may be drawn upon any surface, and have any sort of lines for its sides: but it is not usual to consider any except *plane triangles* drawn on a plane with right-lined sides, and *spherical triangles* drawn on a sphere with arcs of great circles for the sides.

The two most important properties of the triangle are, that the sum of its angles is always two right angles, and that the area is half that of a rectangle of the same base and altitude. Both of these propositions admit of such practical verification as would make them perfectly intelligible to those who do not understand geometry. Take the greatest angle BAC of a triangle cut out in



paper, and fold the paper so that A may rest on BC at F, the part ADE folding over DFE. Then it will be found that by further folding, ECL can be brought over EFL, and BDK over FDK, so that the three angles of the triangle KFD, DFE, and EFL, are so placed that the first side of the first and the last side of the last, KF and FL, are in the same straight line, and the three make up the two right angles KFA, AFL. Again the triangle BAC is either the sum or difference of the two right-angled triangles FAC, FAB, which are the halves of the rectangles FACH, FABG,





the sum or difference of which is the rectangle BGHC: whence the triangle is the half of the rectangle BGHC.

The three lines which bisect the angles of a triangle meet in one point, which is the centre of the inscribed circle; and the three perpendiculars which bisect the three sides also meet in one point, which is the centre of the circumscribed circle. Moreover the three lines drawn from the vertices bisecting the sides meet in one point, which is the centre of gravity of the triangle: as also do the three perpendiculars drawn from the vertices to the sides.

The number of isolated theorems which might be given on this subject is very large, but there is little, unconnected with the trigonometrical formulæ, which is of use in application.

TRIA'NGULA and TRIA'NGULUM AUSTRALE (constellations). The first (the Triangles) is a northern constellation, surrounded by Perseus, Andromeda, Aries, and Musca. It is one of the old constellations, but there is only one triangle in Aratus. Hevelius added the second. The second, or Southern Triangle, is a constellation of Bayer, lying between Ara, Centaurus, and the South Pole.

TRIA'NTHEMA, a genus of plants of the natural family of *Portulaceæ*. The species are found in the tropical parts of the old and new world, and in the subtropical parts of Africa. They occur as weeds in every part of the plains of India.

TRIBE (*tribus*, φυλὴ). All the states of antiquity of which we have any records were divided into a certain number of tribes, consisting of the great bodies of citizens of which the state was composed. These tribes however were of two different kinds, either genealogical or local. (Dionys. Hal., iv. 14.) The former were the different national elements of which a state was made up, that is, each was a distinct people, though akin to the others, and each traced its origin to some mythical ancestor. The local tribes, to which a later origin must be assigned, and which in most cases superseded the old genealogical tribes, were artificial local divisions made for political and other purposes, and any one of them might contain people who, according to the genealogical division, would belong to different tribes. At Rome the three ancient Romulian tribes gradually died away after the establishment of the thirty local tribes of Servius Tullius.

TRI'BOLO, NICOLO DI, born at Florence in 1500, was originally brought up to the trade of a carpenter, but becoming acquainted with Sansovino, he studied under him. The first works on which he was employed after quitting that master were two statues of sibyls for the front of San Petronio at Bologna, which at once stamped his reputation. At Pisa he was employed by the sculptor Pietrosanta, and executed a statue of Nature, for Francis I. of France. He employed his talents less honourably when, on Florence being besieged by Clement VII., in 1529, he furnished that pope with plans and models of the city and its outworks. Clement afterwards employed him to assist Michel Angelo in the sculptures intended for the chapel of San Lorenzo; and he had commenced his work, when he was disabled from proceeding by an attack of ague. Tribolo executed but little after this. He died Sept. 7, 1550.

TRIBONIAN. [JUSTINIAN'S LEGISLATION.]

TRI'BULUS, a genus of the natural family of *Rutaceæ*, the fruit of which is armed with prickles. It is termed *Caltrops*, from the pronged instruments formerly employed and still in use in the East for obstructing the progress of cavalry. The species are found in the south of Europe and the subtropical and tropical parts of the world. *T. terrestris* is sometimes cultivated in the gardens of the West Indies on account of the sweet scent of its flowers.

TRIBUNALS OF COMMERCE are courts established in all the large towns of France for the quick and inexpensive decision of commercial disputes, and all matters relating to trade and debt. The presidents and judges are chosen from among the most intelligent and respectable merchants of their respective towns, and serve without emolument. A president and two judges form a court, which sits every day except Sunday. The clerks are the only officers who are paid. The expense of these courts for the whole of France does not much exceed 7000*l.* sterling; their decisions are admitted to be highly satisfactory and equitable. (*Code de Législation Française*; Macgregor's *Commercial Statistics.*)

TRIBUNAL OF FIRST INSTANCE. [DEPARTMENT.]

TRIBU'NUS (φύλαρχος), according to the etymology of the word, signifies any officer who is at the head of a tribe [TRIBE], and conducts either the internal administration of a tribe, or represents it in its relations to other powers in the state. This signification applies indeed to some of the officers of this name who occur in the history of Rome, but in regard to others it must remain doubtful why they bore this name. There were Tribunes of the Three Romulian Tribes; a Tribunus Célerum, an office which existed only under the kings; and the Tribunes of the Thirty Servian Tribes. The investigation of the functions of these officers belongs to the history of Rome.

The Tribuni Plebis were the most important among the many officers bearing the name of tribune, and whenever tribunes are mentioned without any further qualification, the tribuni plebis are meant. In the year B.C. 494, when the plebeians had been driven by the oppression of the patricians to secede to the Mons Sacer, peace was concluded between the two orders on condition that the plebeians should be allowed to have magistrates of their own to protect the members of their order against the patrician magistrates, and whose persons should be sacred and inviolable. It was further agreed, that whoever should maltreat, kill, or compel a tribune to anything by force, should be outlawed, and his property should be forfeited to the temple of Ceres. These agreements however were insufficient to protect the tribunes against various annoyances of the patricians, and it was found necessary, soon after the institution of the tribunate, to give still more security to the exercise of their power. A law was accordingly passed forbidding any one to interrupt or disturb the tribunes in their transactions with the plebs, and that any one who should act contrary to this law should give bail to the tribunes for any fine they might propose to the comitia to inflict upon him; those who refused to give bail forfeited their life and property. (Dionys. Hal., vii. 431, &c.; Livy, iii. 13; comp. Niebuhr, 'Hist. of Rome,' ii., p. 98.) The inviolability of the tribunes was

finally established after the time of the decemvirate by a law of M. Horatius.

Some authorities state that two tribunes were elected on the Sacred Mount, and that these two afterwards chose three more colleagues; others say that five were elected at once; and others again that no more than two were appointed. But the probability is in favour of five tribunes, so that one was taken from each of the five Servian classes. Thus much only is certain, that in the year B.C. 457 the number of tribunes was increased to ten; so that if they really bore any relation to the classes, each furnished two. This number remained unaltered to the end of the republic. The tribunes were attended by public servants, called viatores, who carried their commands into effect. The history of the tribunate is an important element in the history of Rome. The tribunes were the organs of the democratic principle, and the instruments of its development. Sulla, among his other constitutional changes, reduced the power of the tribunes; but it was re-established by a law proposed by Cn. Pompeius Magnus, B.C. 70.

In B.C. 23 Augustus received the office of tribune for life, and at intervals of five years he himself appointed one of his friends or relatives as his colleague in the tribunate. This tribunicia potestas of an emperor was conferred upon him by the senate, and was deemed equivalent to regal or dictatorial power with a popular name. (Tacit., 'Annal.,' i. 2; iii. 56.) The example of Augustus was followed by his successors, and the tribunicia potestas became an essential part of the imperial dignity.

The Tribuni Militum cum Consulari Potestate were officers with consular authority, who were elected both from patricians and plebeians. The first were elected in 444 B.C. During the continuance of these tribunes no consuls were elected. In B.C. 366 the office of the military tribunes with consular power was abolished, and the consulship restored. These consular tribunes had the same power as the consuls, with the exception of that part of it which had been detached from it and given to the censors.

The Tribuni Militares, or Militum, or tribunes of the soldiers, were a class of officers in the Roman armies, of whom at first there were four in a legion. In later times the number of tribunes for each legion was increased to six, and their appointment was sometimes left altogether to the consuls. (Liv., xlii., 31.) But this seems to have been an exception to the rule, for subsequent to that time we again find that the people had the election of a part of the tribunes. (Liv., xliii. 14; xliv. 21.) The functions of these tribunes of the soldiers consisted in maintaining the discipline among the troops, superintending their exercises and their state of health, in inspecting the sentinels, settling disputes among the soldiers, in taking care that they received their necessary provisions, and the like.

TRICHI'ASIS (τριχίασις) is a disease in which one or more of the eyelashes are turned inwards, so as to be in contact with the front of the eyeball. The irritation thus excited produces all the pain and other symptoms of inflammation of the conjunctiva, and if long continued may terminate in opacity of the cornea and complete blindness. For a permanent remedy, some of the operations for entropium must be performed, or the portion of the inner margin of the eyelid from which the inverted lashes grow must be removed with their bulbs.

TRICHI'LIA, a genus of plants of the natural family of *Meliaceæ*. The species are found in the tropical parts of America, and a few in Africa and in New Holland. An Indian species, *T. spinosa*, is not well known, but the oil of its seeds is said to be a useful remedy in chronic rheumatism and paralytic affections.

TRICHINO'POLI, a fortified city of Hindustan, formerly the capital of a Hindoo principality, now included in the presidency of Madras, is situated about half a mile from the south bank of the river Cavery, in 10° 50′ N. lat. and 78° 49′ E. long., 38 miles W. from Tanjore, and about 90 from the Bay of Bengal.

The principality of Trichinopoli, a relic of the kingdom of Madura, of which it originally formed a part, retained its independence till 1736, when it was made tributary to the Mohammedan government. In 1741 it was taken by the Mahrattas, but was retaken in 1743, and in 1749 it devolved by inheritance to Mohammed Ali as nabob of the Carnatic. The civil and military government of the Carnatic, including the district and city of Trichinopoli, were ceded to the British in 1801, on the East India Company engaging to pay to the nabob annually one-fifth of the net revenue of the country, and providing for the principal officers of his government.

The city of Trichinopoli is situated on a rocky eminence; it is very large, and is said to contain, including the suburbs, 80,000 inhabitants. The houses generally are inferior to those of the neighbouring city of Tanjore. The chief public buildings are, a palace, a mosque, and two Hindoo temples. The fortress is strong, and the British government generally keeps five or six regiments there, partly on account of the salubrity of the situation, and partly as a convenient point of communication with other parts of southern Hindustan. A mission-church was founded here by Schwarz in 1762, which still retains a small congregation of converts to Christianity.

TRICHODERMA'CEÆ, a tribe of plants belonging to the suborder *Gasteromycetes*, of the natural order *Fungi*. The genus *Asterophora* is found on other fungi when in a decaying state, especially the Agarics. The genus *Onygena* is remarkable for being found on the hoofs of various animals, more especially those of the horse. The species of the genera *Trichoderma myrothecium* and *Agerita* are found in Great Britain on fallen trees, dried plants, and various kinds of decaying wood.

TRICHODE'SMA, a genus of plants of the natural family of *Borragineæ*, so named from the stamens being united together by interwoven hairs. The plants have little beauty and are of little use.

TRICHO'MANES, a genus of ferns belonging to the suborder *Hymenophyllaceæ*. *T. speciosum* is the only British species. It is extremely rare,

and very beautiful, combining the characters of the true ferns, mosses, and sea-weeds. It is found at Killarney, Wicklow, and Youghal in Ireland, in great beauty.

TRICHONE'MA, a genus of plants belonging to the natural order *Irideæ*. *T. columna* is the only British species. It is found in sandy places in Jersey and Guernsey.

TRICHOSA'NTHIS, a genus of the natural family of *Cucurbitaceæ*, so named from the corols being fringed, something like those of the Marsh Trefoil. Many of the species are edible, and from the long, often sinuous-formed fruit, they have been named Snake Gourds, the *Anguina* of some botanists. The principal edible species is *T. anguina*, a native of India and China. The fruit is often nearly a foot long, and, on account of it, the plant is much cultivated in different parts of Asia, the fruit being universally used in the stews and curries of the natives of India.

TRICHOSPE'RMI, a tribe of plants belonging to the suborder *Gasteromycetes*, of the natural order *Fungi*. The genera belonging to this order are rather numerous, and are divided into *Trichogastres*, those having a fleshy consistence; and *Myxogastres*, those having a soft and mucilaginous consistence.

To the first division belong all those forms of fungi which are popularly known as Puff-Balls, Blind-Man's-Buff, Devil's Snuff-Boxes, &c. They have obtained these names on account of the property they possess of giving out, when in a ripened state, the sporules with which their interior is filled. These sporules are so exceedingly small and light, that on the peridium, or external covering of the plant, being broken, they rise into the air like smoke. They possess a curious property of repelling the particles of water, so that if the surface of a basin of water is covered with them, the hand may be plunged to the bottom of it without being wetted. The genus *Geaster* embraces those Puff-Balls whose peridium is double, the outer layer of which splits up into star-like expanding rays. Nine species of this genus are found in Great Britain. The genus *Bovista*, Bull Puff-Ball, has a thin paper-like covering, which is furnished with a distinct bark, which peels off as the plant grows old. There are two species of this genus common in England, where they are found on the ground on heaths and dry pastures. The genus *Lycoperdon* contains a remarkable species, *L. giganteum*, Giant Puff-Ball, which is sometimes met with in fields and plantations in Great Britain. It may be known directly by its large size, specimens frequently measuring several feet in circumference. When dry, the inside of this and other puff-balls have been used for the purposes of restraining hæmorrhage by direct application to a wounded part. For this purpose it at one time formed an essential article in the case of every surgeon. It is now seldom used among medical men, but it has still a great popular reputation. Another species of Puff Ball common in our pastures is the dwarf *L. pusillus*. It may be known by its small size. The most common of all the species of *Lycoperdon* is the *L. gemmatum*, the Studded Puff Ball.

The genera *Scleroderma*, *Elaphomyces*, and *Cenococcum* are distinguished by the hard corky character of their peridium, which sometimes approaches the consistence of horn. They are common on dry ground, on heaths, in gardens, woods, &c.

The second division of the Trichospermi, the *Myxogastres*, contains a larger number of genera than the first, but the plants are much smaller and less obvious. They are most of them very minute, and are found on the trunks of old trees and on decaying wood. Their forms and colours are exceedingly various, and sometimes very beautiful. The only British species is the *L. epidendrum*, which is found on rotten stumps and pales in the spring and autumn of the year. This plant varies much in size and colour. Its covering is frequently of a blood-red colour, as also the juice which oozes out from the interior.

The genus *Spumaria* is found attached to the stems of grasses, and looks like a thick white froth upon them. On this account it is frequently supposed to be of animal origin.

TRICO'CCÆ, the name of a natural order in the 'Fragments of a Natural System' of Linnæus. *Euphorbia* was selected by Linnæus as the type of this order. In the system of Jussieu, as adopted and amended by De Candolle and Lindley, this order is called *Euphorbiaceæ*.

TRIDA'CNIDÆ. The *Tridacnacea* of Lamarck form a family belonging to the first section of his *monomyarian Conchifers*, or mollusks furnished with bivalve shells which have a single muscular impression. This family comprises the genera *Tridacna* and *Hippopus* (*Chamidæ*).

TRIDENT (*tridens*, *τρίαινα*) is any instrument of the form of a fork, with three prongs. Instruments of this kind were used by the ancients, as among ourselves, for various purposes. In mythology the trident is the attribute of several marine divinities, such as Nereus (Virg., 'Æn.,' ii. 418) and the Tritons (Cicero, 'De Nat. Deor.,' ii. 35), but above all of Neptune (Poseidon). The trident in these cases is the same as the sceptre with other gods, the emblem of the power of these gods of the waters.

TRIENTA'LIS, the name of a genus of plants belonging to the natural order *Primulaceæ*. The only British species of this genus is the *T. Europæa*, the European Chick-Weed, Winter-Green. It is distinguished from the American species by possessing elliptical instead of lanceolate leaves. This plant is rare in England, being only occasionally met with in woods in the northern counties; it is however abundant in many parts of the Highlands of Scotland. *T. Americana*, the American Chick-Weed, Winter-Green, has lanceolate leaves. It is found in mountainous districts in Canada and Virginia.

TRIER (*Trèves*), one of the five governments of the Prussian Rhein-Provinz, is bounded N. by the government of Aix-la-Chapelle, E. by that of Coblentz, W. by Birkenfeld and the Bavarian Rhein-Kreis, S. and S.W. by France, and W. by Belgium. It is divided into twelve circles, the area is 2775 square miles, and the population in 1847 was 488,699, of whom 414,658 were Catholics, 68,895 Evangelicals, 125 Mennonites, and 4981

Jews. The face of the country is hilly, with a considerable extent of forest and pasture land, but not much that is adapted to tillage. There are mines of iron, lead, calamine, copper, and coal. A good deal of wine is produced on the banks of the Moselle. The manufactures are of various kinds, but none of any considerable importance. The chief towns are — TRIER: *Saarbrücken*, which is about 40 miles S. from Trier on the Saar, which here becomes navigable and is crossed by a bridge leading to the suburb of St. Johann; it has a castle, which was formerly the residence of the princes of Nassau; steel and iron works; factories for the making of pins, nails, and hardware; potteries; tanyards; and a population of about 8000, who also trade in varnished leather, glass, timber, and coal: and *Saarlouis*, which is a well-built strongly-fortified town, entered by two gates, 12 miles N.W. from Saarbrücken on the left bank of the Saar, and has 4500 inhabitants; the fortifications are hexagonal in form, and are composed of six bastions with five ramparts planted with trees; near this town, which is the birthplace of Marshal Ney, are mines of iron, lead, and coal; leather, steel-ware, wire, and fire-arms are manufactured.

TRIER (*Trèves*), the capital of the government of Trier, is situated in 49° 46′ N. lat. 6° 38′ E. long., on the right bank of the Moselle, over which there is a stone bridge of eight arches, 690 feet long and 24 feet wide. It lies in a valley of extraordinary fertility, bounded by low hills covered with vines. This city is undoubtedly one of the oldest cities in Germany. When Julius Cæsar was in Gaul, the Tréviri were a powerful people; their chief city was afterwards called Augusta Trevirorum. In later times this city was the residence of several emperors. It was nearly annihilated by the Barbarians, yet subsequently almost recovered its ancient splendour under the archbishops of Trèves. This city was taken by the Duke of Marlborough in 1704, and during the wars of the French revolution it suffered greatly. Under the government of Prussia, to which it was assigned by the congress of Vienna, it is gradually recovering. The population, exclusive of the garrison and the suburbs, is 14,500. The city, which is an oblong parallelogram a mile and a half in length, includes several large gardens. The streets are irregular, and for the most part narrow: there are nine suburbs, and eleven gates. Trier is the seat of a bishop and chapter, and of several tribunals and public offices. The university, founded in 1454, is now called a gymnasium: it has a library of above 70,000 volumes and 2000 MSS. Among the public buildings most worthy of notice are:—the ancient electoral palace, now converted into barracks: it stands partly on the site of an immense Roman edifice, the walls of a fragment of which still remaining are 90 feet high and 10 feet thick. The cathedral of St. Peter and St. Helena, in the earliest Byzantine style, is chiefly remarkable for its altars and its marble gallery. The Liebfrauen-kirche (church of Our Lady), built between 1227 and 1248, is one of the finest specimens of the light and elegant style of pointed architecture. At one extremity of the open space in front of the electoral palace are the remains of the Roman Baths, formerly called the White Gate. Among other Roman remains are the amphitheatre, portions of an aqueduct, and the bridge over the Moselle. The village of Igel, about 6 miles from Trèves, is remarkable for a highly-ornamented Roman obelisk 72 feet high. The Porta Nigra, or Black Gate, is one of the most remarkable Roman monuments in the north of Europe. It was four stories high on each of the flanks, though there are only three stories remaining in one of them. In the centre there are two arched passages, each 14 feet wide, with two stories over them. The stories are all ornamented with Tuscan columns, and they are pierced with windows to light the apartments. The length of the building is 115 feet, the depth 47 in the centre and 67 in the two wings, of which the one that is complete is 91 feet high. It is built of massive stone, and is indestructible except by violence. (Wyttenbach's 'Antiquities of Trier,' 1844.) It was probably built in the time of Constantine the Great. The interior at present contains a great number of Roman antiquities found at Trier and in the neighbourhood. Some of the sculptures have great merit. Trèves has manufactures of cloth, woollens, porcelain, hats, tobacco, paper-hangings, and soap, several breweries and distilleries, and a very considerable trade in wine, timber, coals, and corn.

TRIESTE, the government of the southern division of the kingdom of Illyria, consisted of Austrian Friuli, a small portion of the Venetian territory, the district of Trieste, the whole of the peninsula of Istria, the southern part of Carniola, and the Quarnero Islands. Under the new arrangement of the Austrian Empire, the territory of the government of Trieste has been divided into—the counties of Görtz and Gradisca, the margraviate of Istria, and the town and territory of Trieste.

The town and territory of Trieste have an area of 36 square miles, with a population of 83,114. It is an entirely independent community, belonging to no crownland, and is under the immediate jurisdiction of the imperial ministry, without the intervention of any governor or viceroy. The other territories of the government are included in the Crownland of ILLYRIA, under which head the face of the country and the chief towns are noticed.

TRIESTE, the Roman *Tergeste*, is a flourishing commercial city and seaport of Austria, situated in 45° 48′ N. lat., 13° 38′ E. long., at the north-eastern extremity of the Adriatic, about 70 miles E. by N. from Venice, and has about 70,000 inhabitants. It consists of two parts; the old town, standing on a hill with a castle on the summit, and the new town called Theresienstadt, which is built on level ground extending to the sea-side. The old town has narrow, crooked, dirty streets, especially in the old Jews' quarter. The new town however forms a regular square with broad streets crossing each other at right angles, and some canals, one of which, called the Great Canal, presents a very animated appearance. There are 31 squares or market-places, of

which the Theresienplatz and Joseph's Platz in the new town are the handsomest. There are 9 churches, belonging to different sections of Christians; besides other great public buildings, such as St. Peter's church, the ancient cathedral, the synagogue, and the Exchange, the city contains many very large and handsome private houses. Trieste has been long a free port, and is the most important and wealthy commercial city in the Austrian dominions. Consuls of almost every nation in Europe reside there. The commerce of Trieste was much increased by the commercial treaty concluded with Greece in 1835, and by the new institution of the Austrian Lloyd's, which is supported by the government. The number of ships engaged in the commerce of Trieste is about 2400, of which, in 1849, 403 were employed on long voyages, and 27 were steamers. The steamers ply to Venice, Greece, Constantinople, Trebizond, and Egypt. The harbour is defended by a strong battery on the new mole. There are two lazarettos near the harbour. A new naval school and naval arsenal are now being constructed; and a terminus for the Vienna-Trieste Railway, which is now open from Vienna to Laybach, has been lately finished. Among the manufactures, oil-soap, leather, rosoglio, and wax, are the principal. Among the exports are the productions of the mines of Idria, those of Hungary, linens, tobacco, and woollens from different parts of the Austrian dominions, and printed calicoes from Switzerland. The imports are cotton from Egypt; hides, raisins, silks, rice, and oil from the Levant; wheat from Odessa; and all kinds of tropical and colonial produce from the West and East Indies and Brazil. Shipbuilding, including the construction of frigates and men-of-war, is carried on to a great extent. Among the literary establishments the Scientific and Nautical School, with 16 professors, the public library, the Gabinetto di Minerva with a library and museum, and the gymnasium, are the principal. The hills surrounding the city are adorned with beautiful country-seats and gardens.

TRIFO'LIUM, the name of an extensive genus of plants belonging to the curvembryose division and to the papilionaceous tribe of the natural order *Leguminosæ*. This genus is one of the most extensive in the vegetable kingdom. Don, in Miller's 'Dictionary,' enumerates 165 species. They are principally inhabitants of temperate climates, and are found in all quarters of the globe.

Trifolium incarnatum, Flesh-Coloured Trefoil, or Scarlet Clover, is a native of the south of Europe. It is an annual of rapid growth, so that in southern climates it may be sown in summer after an early crop of corn, and fed off or cut before winter. It will stand the winter well if sown later, and give very early feed in spring. It produces a great abundance of seed if allowed to ripen; and on its introduction into England great profits were made by the first cultivators of it, by growing it entirely for seed. It is a valuable addition to the plants usually raised for fodder, and fills up an interval between other plants by its very early and rapid vegetation. The mode of sowing the *Trifolium incarnatum* is simple, and attended with very little expense. In the month of August, as soon as the crops of corn have been reaped, the stubble is well harrowed to raise a small portion of mould; the Trifolium is then sown at the rate of four bushels of the seed, in the husk, per acre. There is a double advantage in sowing it in this manner: it saves the thrashing required to separate the seed, as a very slight beating will separate the florets of the head or spike sufficiently to sow them; and it vegetates sooner from the moisture retained in the husk which envelops the seed. A bush-harrow is drawn over the land to cover the seed, and it is rolled with a barley-roller, if the land be of a firm nature, or with a heavier roller if it be a loose soil. Thus the Trifolium will vegetate much more certainly than if the land had been regularly ploughed and harrowed, which would have loosened it too much. It is not advantageous to let the *Trifolium incarnatum* be cut for hay. Its stem then has acquired a hard woody texture, and it makes very inferior hay. Its principal value is to feed off with ewes and lambs before other feed is ready in spring, or to cut it green for horses and cattle. It must be recollected that the *Trifolium incarnatum* is a 'catch crop,' that is, one which comes in between two regular crops, without interfering with the rotation, and that it costs little more than the seed, which is easily raised, or may be bought at a very moderate rate.

T. arvense, Hare's-Foot Trefoil, is a native of Europe, and is abundant in corn-fields and dry pastures in Great Britain. Its soft hairy subcylindrical heads or spikes give it a very remarkable character. *T. maritimum*, Sea-Side or Teasel-Headed Trefoil, is a native of Europe, in salt marshes and meadows near the sea-side. It is found on the east and south coasts of Britain. *T. Alexandrinum*, Alexandrian Trefoil, or Clover, is a native of Egypt, about Alexandria. It is the only Trefoil that is cultivated in Egypt, where it is extensively used as fodder for cattle. *T. medium*, Meadow-Trefoil, Marl-Clover, or Cow-Grass, is a frequent plant in the pastures of Britain, where it can be recognised by its zigzag stem, from which circumstance it is sometimes called Zigzag Trefoil. *T. pratense*, Common Purple Trefoil, or Red Clover, has reddish purple flowers, and is frequent in meadows and pastures, where it blooms all through the summer. *T. repens*, White Trefoil, White or Dutch Clover, is very abundant in the meadows and pastures of Britain, and next to the *T. incarnatum* and *T. pratense*, is valued and cultivated most of any of the clovers. According to the soil on which it is grown, and the climate to which it is exposed, this plant assumes great varieties. This plant is said to be the *Shamrock* of Ireland, and is worn by the Irish as the badge of their country. The original shamrock does not appear to have been a clover, but the *Oxalis acetosella*, which has also leaves with three divisions.

TRIFO'RIUM, a term of uncertain origin, applied to the upper galleries formed by small open arches above those dividing the nave from the side-aisles of a church, and beneath the clerestory windows, this intermediate tier being within

the sloping roof over the aisles. In general the triforium is very shallow or narrow, and the arches in front of it small and low, but there are great differences in these respects even in buildings of the same period and style.

TRIGLA, a genus of Acanthopterygious osseous fishes popularly known as Gurnards, and belonging to the family *Loricati* in the arrangement of Cuvier.

The head of Trigla is mailed and angular; the opercle and shoulder-bones armed with spines; the body is scaly; there are two distinct dorsal fins; beneath the pectorals are three detached rays; the branchiostegous membrane has seven rays; both jaws and the front of the vomer are armed with fine velvety teeth. The gurnards are fishes always remarkable for singularity of form, and often for brilliancy of colouring. In the British seas the commonest species are the Gray Gurnard (*Trigla Gurnhardus*), a silvery gray fish more or less clouded with brown and speckled with black; the Red Gurnard (*Trigla Pini*), of a bright rose-red colour; and the Sapphirine Gurnard (*Trigla Hirundo*), a large and handsome fish remarkable for the vivid green and blue hues of the inner surface of its large pectoral fins. The two last are most abundant on the western coasts. Several other rarer species are also inhabitants of the British seas. There are some beautiful small species in the Mediterranean, where also lives the Flying Gurnard (*Dactylopterus volitans*), which has the fin-rays of the pectorals connected by membranes, by means of which the fish is enabled to support itself for some time in the air in the manner of the Flying Fish. It is a handsome species, above a foot long.

TRIGLO'CHIN, the name of a genus of plants belonging to the natural order *Juncaginaceæ*. Two only of the species inhabit Europe, and these are found in Great Britain. *T. palustre*, the Marsh Arrow-Grass. When bruised the leaves give out a fetid smell. In dry seasons the roots frequently become nodulose, presenting something of the appearance of a scorpion's tail. It grows in damp marshy places, and is very abundant in many parts of this country. *T. maritimum*, Sea-side Arrow-Grass, is a much larger and stouter plant than the last, and is always found growing near the sea or in marshes under the influence of salt-water. It is a native of North America as well as Europe.

TRIGLYPH. [Civil Architecture, iv., 608.]

TRIGONELLA, the name of a genus of plants belonging to the curvembryose division and to the papilionaceous tribe of the natural order *Leguminosæ*. The known species of this genus are upwards of thirty. Only five of them are European, and only one is found in Great Britain. *T. Fœnum-Græcum*, the Common Fenugreek, is a native of the south of Europe. Dr. Sibthorp found it in abundance on the shores of Asia Minor. In some parts of the south of Germany this plant is extensively cultivated as fodder for horses and sheep. It does not however appear adapted for the climate of Britain, on account of the uncertainty of the weather. *T. ornithopodioides*, the Bird's-Foot Trefoil, is found in Great Britain, in dry sandy pastures, but not very commonly. *T. elatior*, Tall Fenugreek, found in Asia Minor and the Isle of Cyprus. *T. esculenta*, Esculent Trigonella, is a native of some parts of the East Indies, where its legumes are eaten by the natives as food.

TRIGO'NIDÆ, a family of conchiferous mollusks, the type of which is the genus *Trigonia*, Brug.; and which Lamarck, who makes it consist of that genus and of *Castalia*, places between his *Arcacées* and the *Naiades*.

Cuvier arranges the genus *Trigonia* under the great genus *Arca*, Linn., and next to *Nucaul*, which last genus stands at the end of Lamarck's *Arcacées*.

M. de Blainville makes *Trigonia* the last genus of his 7th family, *Camacea*, placing it next to *Isocardium*.

Mr. J. E. Gray arranges the *Trigoniadæ*, consisting of the genus *Trigonia* only, between the *Mycetopidæ* and the *Arcadæ*, under his third order, *Goniopoda*.

The genus *Trigonia* presents the following characters:—Shell thick, nacreous, subtrigonal, equivalve, inequilateral, the umbones rather small and but little recurved; hinge complex, dissimilar, the right valve having two great oblong teeth, diverging from the umbo, strongly furrowed, penetrating into two excavations, of the same form and equally furrowed, in the left; ligament external; muscular impressions not united by a pallial impression.

For an excellent account of the anatomy of the mollusk of *Trigonia*, see 'Proceeds. Zool. Soc.,' p. 30, 1849; and for a monograph of the recent species (three in number), see the same work, p. 159. Locality, the Australian Seas. Example, *Trigonia pectinata*, Lam.; *T. Margaritica*, of 'Annales du Museum,' tom. iv. p. 355, from New Holland.

TRIGONOMETRICAL SURVEY. The merit of first applying trigonometry to geodetic operations belongs to Willebrord Snell, who in 1617 undertook a survey of Holland, for the double purpose of establishing the geographical positions of the principal cities in that country, and measuring a degree of the terrestrial meridian. The method which he followed was the same in principle as that which would be adopted at the present time. Having formed a series of triangles extending over the country, he observed their angles with a quadrant, and computed their sides from a base which was carefully measured with wooden perches on the ground. He also determined the direction of the meridian at Leyden, and observed its inclination to a side of one of his triangles, and thereby obtained the bearings of the different angular points. Lastly, by observing the altitude of the pole-star with a five-feet quadrant at Alkmaar, Leyden, and Bergen-op-zoom, he determined the amplitudes of two celestial arcs; and on comparing the amplitudes with the terrestrial distances computed from the triangles, and reduced to the direction of the meridian, he concluded the length of a degree to be 28,500 Rheinland perches, or 55,100 French toises, equivalent to about $66\frac{3}{4}$ English miles. The result is about 3 miles too small.

About the middle of the same century Riccioli and Grimaldi undertook to measure an arc of a great circle of the earth in Lombardy.

Picard, in 1669, undertook to measure the meridional arc between Paris and Amiens. This operation was conducted with far greater precision than any previous one of the same kind, and the result had a memorable application, as it furnished Newton with a sufficiently accurate knowledge of the earth's diameter, and consequently of the dimensions of the lunar orbit, to enable him to compute the force of terrestrial attraction at the distance of the moon, and thereby establish the law of gravitation. Picard found $1^\circ = 57{,}060$ toises, equivalent to 364,876 English feet, or about 69.1 miles.

Picard's measurement gave rise to a more extensive operation,—the prolongation of the meridian through the whole extent of the French territory, and the construction of a geometrical map of France by Dominic and James Cassini (1683-1700).

The discussions to which this operation gave rise in the Academy of Sciences were the immediate cause of the two expeditions to Peru and Lapland, which were undertaken under the auspices of the French government, for the purpose of definitely settling the question of the compression of the earth. In 1735 Bouguer, La Condamine, and Godin, members of the Academy, set sail for Peru, where they were joined by two Spanish officers, Juan and Ulloa.

While Bouguer and his associates were carrying on their operations in Peru, an arc of the meridian was measured near the polar circle by Maupertuis, Clairaut, Camus, Lemonnier, and Outhier. This party reached Tornea, at the extremity of the Gulf of Bothnia, in 1736.

Soon after the return of Maupertuis and his party from the polar circle, an important survey was undertaken in France by Cassini de Thury and Lacaille, for the purpose of verifying the former measure of the meridian and laying the foundation of an accurate map of the kingdom.

In 1751 Boscovich and Le Maire began a survey of the Papal States, and in the course of the operation determined the meridional distance between the parallels of Rome and Rimini.

Lacaille, in 1752, measured an arc of meridian at the Cape of Good Hope, which has been recently remeasured by Mr. Maclear, astronomer at the Cape of Good Hope, a voluntary addition to the arduous labours of the Observatory.

Beccaria, between 1762 and 1764, measured an arc of the meridian in Lombardy.

Two surveys, executed by Liesganig in Austria and Hungary, between 1762 and 1769, have been usually cited in the history of geodetic measures, but are now known to be deserving of no credit.

The first geodetic survey executed in England was undertaken with the immediate object of establishing a trigonometrical connection between the observatories of Paris and Greenwich, in order to determine the difference of longitude. This was undertaken by General Roy, who began his operations by measuring a base of 27,404 feet on Hounslow Heath in the summer of 1784.

The resolution adopted by the French Convention in 1791 to establish a decimal system of weights and measures of which the unit should be an aliquot part of the quadrant of the meridian, gave rise to a remeasurement of the meridian of Paris from Dunkirk to Barcelona. In the conduct of this survey, the most important in reference to the figure of the earth that has yet been executed, the French astronomers introduced numerous important improvements both into the theory and practice of geodesy.

From the results of this operation, compared with the degree measured in Peru, the dimensions and ellipticity of the earth were deduced, and the *Mètre* determined. The earth was assumed to be a spheroid of revolution; the deduced ellipticity was $1 \div 344$; and the mètre, or ten-millionth part of the quadrant of the meridian, at the temperature of freezing water, was fixed at 443,296 lines of the toise of Peru, the normal temperature of the iron toise being 13° of Réaumur, or 61° 15′ of Fahrenheit.

The prolongation of the meridian through Spain, which formed a part of the original project, was interrupted by the death of Mechain, but was subsequently effected (1807–1809) by Biot and Arago.

The arc, which was measured by Maupertuis and his associates in Lapland in 1736, was remeasured by Svanberg in 1801–1803, and extended in both directions so as to increase the amplitude about 40″.

A trigonometrical survey of Holland was executed under the direction of General Krayenhoff, from 1801 to 1809, which may be regarded as a continuation of the general survey of France.

A general survey of the British Islands, under the direction of the master-general of the Ordnance, was begun in 1791, and has been continued to the present time. The first conductors of this national undertaking were Colonel Williams and Captain (afterwards General) Mudge, of the Royal Engineers, and Mr. Dalby, who had previously assisted General Roy.

Were it not for the admirable maps which are from time to time issued from the Ordnance map-office, it might be inferred that the survey had been discontinued during the last thirty years. The operation has however never been lost sight of. For some years after the last published account, the triangulation was carried on in Scotland both along the eastern and western coasts. About 1818 the survey of Ireland was begun. A base was measured on the banks of Lough Foyle, near Londonderry, with an apparatus differing from any which had previously been used, and with precautions to ensure accuracy which probably have never been surpassed. Depending on this base, a net-work of triangles was established over the whole of Ireland. The topography of Ireland has been completed; and the angles of the different chains of primary triangles extending over the whole of Scotland and the adjacent islands have now also been observed.

A trigonometrical survey of India was begun by Colonel Lambton in 1791, which was continued under the direction of Colonel Everest. It was

originally undertaken for the purpose of connecting the coasts of Coromandel and Malabar, and of determining the latitudes and longitudes of the principal places in the peninsula.

Since the last general peace trigonometrical surveys have been carried on in all the principal countries of Europe—England, France, Italy, Austria, Bavaria, Denmark, Prussia, and Russia.

An extensive trigonometrical operation has been carried on in Russia for a series of years, and an arc, exceeding 8° in amplitude, has been measured on the meridian of Dorpat.

The last survey we shall mention is one which was executed by Bessel, in Prussia, between 1831 and 1836. The immediate object of this undertaking was to connect the Russian triangulation with a chain of triangles which had been measured in the western part of Prussia, extending through Hesse, Thuringia, and Brandenburg, to Silesia, and connecting the Dutch (and thereby also the French and English) triangles with those of Bavaria and Austria. In this operation Bessel included the measure of an arc of the meridian of Königsberg.

By means of the different surveys to which we have now alluded, the greater part of Europe has been covered with chains of triangles, whereby not only the geographical positions of all the principal places and remarkable objects have been determined by actual measurement, but all the measured arcs of meridians and parallels, and all the principal observatories, have been trigonometrically connected with each other. The comparison of the astronomical and geodetical positions of so many connected points is, perhaps, even better calculated to lead to an accurate knowledge of the local configuration of this quarter of the globe than the measurement of isolated degrees.

If the earth were a regular spheroid of rotation, the latitudes and longitudes deduced from geodetical measurements commencing with a given observatory would agree exactly (supposing no errors) with those given by astronomical observations. Such agreement however is not found to exist, and no regular figure can be assigned to the earth by which the results of the two methods can be entirely reconciled. An instance or two will suffice to give an idea of the extent to which the discordances may reach. In the remeasurement of Beccaria's arc, the astronomical difference of latitude between Andrate and Mondovi was found to be 1° 7′ 26″.98, while the difference computed from the French triangulation, taking the observatory of Paris as the point of departure, and assuming the ellipticity = 1 ÷ 308.65, was 1° 8′ 14″.82. The discordance amounts to 47″.84, corresponding to a distance of the meridian of about 4880 English feet, the whole distance being about 368,885 feet. Again, the latitude of Venice deduced from that of Rimini by triangulation was found to differ 17″.2 from the latitude given by direct observation; and the latitude of Rimini deduced from that of Milan differed 27″.4 from the astronomical latitude. Similar anomalies have been found in the surveys in England, France, Austria, and indeed all other countries; and as their amount exceeds that which can with any probability be assigned to errors of observation, they are ascribed to irregularities in the direction of gravity arising from inequalities in the form or internal structure of the earth,—to the attraction of mountains or local variations of density. Puissant shows reason for supposing that in France the curvature of the surface is considerably different on the east and west sides of the meridian of Paris.

We shall conclude this article with a statement of the results of those measures of meridional arcs which appear the most deserving of confidence, and of the elements of the elliptic spheroid of revolution to which they most nearly correspond, as determined by Bessel, in the 'Astronomische Nachrichten,' No. 438 (Altona, 1841). It is necessary to remark that as the sector observations from which the amplitudes of the English and Indian arcs were deduced have been recomputed by Bessel, some slight corrections are made in the latitudes, and the original distances are reduced to British standard feet according to the comparisons of Captain Kater. The distance between the parallels of Mola and Montjouy in the French arc has also been corrected. We have reduced the distances, which in Bessel's table (as well as the original accounts, excepting those of the English and Indian arcs) are all given in terms of the toise of Peru, into English feet, using the ratio of the toise to the foot given by Captain Kater, in the 'Phil. Trans.' for 1821, namely, 6.39459252 : 1. The normal temperature is that of the toise, or 13° of Réaumur, equal to $61\frac{1}{4}$° of Fahrenheit. The numbers in the last column show the variations which are required to be made in the observed latitudes given in the second column, in order that the measured arcs may all belong to the same spheroid of rotation. These variations were determined by Bessel, on the principle that the sum of their squares should be a minimum.

	Latitude.	Amplitude.	Meridional Distance in Eng. feet.	Variations of Latitude.
1. *Peruvian Arc.*	° ′ ″	° ′ ″		″
Tarqui	− 3 4 32.068			− 0.606
Cotchesqui	+ 0 2 31.387	3 7 3.455	1131047	+ 0.606
2. *First East Indian Arc.*				
Trivandeporum	11 44 52.590			− 0.271
Paudree	13 19 49.018	1 34 56.428	574318	+ 0.271
3. *Second East Indian Arcs.*				
Punnæ	8 9 31.132			− 1.470
Putchapolliam	10 59 42.276	2 50 11.144	1029172	− 1.712

Dodagoontah	12	59	52.165	4	50	21.033	1756558	+ 4.016
Namthabad	15	5	53.562	6	56	22.430	2518371	− 1.447
Daumergidda	18	3	16.245	9	53	45.113	3591779	− 0.065
Takel K'hera	21	5	51.532	12	56	20.400	4697321	+ 3.537
Kullianpoor	24	7	11.860	15	57	40.728	5794600	− 2.859
4. *French Arcs.*								
Formentera	38	39	56.11					+ 0.955
Montjouy	41	21	44.96	2	41	48.85	982680	+ 4.115
Barcelona	41	22	47.90	2	42	51.79	988711	+ 0.764
Carcassonne	43	12	54.30	4	32	58.19	1657303	− 0.433
Evaux	46	10	42.54	7	30	46.43	2737009	− 6.447
Pantheon	48	50	49.37	10	10	53.26	3710863	− 1.099
Dunkirk	51	2	8.85	12	22	12.74	4509832	+ 2.144
5. *English Arcs.*								
Dunnose	50	37	7.633					− 1.816
Greenwich	51	28	39.000	0	51	31.367	313718	+ 1.396
Blenheim	51	50	27.632	1	13	19.999	446529	+ 2.705
Arburyhill	52	13	28.031	1	36	20.398	586361	+ 1.395
Clifton	53	27	31.130	2	50	23.497	1036409	− 3.675
6. *Hanoverian Arc.*								
Göttingen	51	31	47.85					− 2.493
Altona	53	32	45.27	2	0	57.42	736425	+ 2.493
7. *Danish Arc.*								
Lauenburg	53	22	17.046					+ 0.451
Lysabbel	54	54	10.352	1	31	53.306	559121	− 0.451
8. *Prussian Arcs.*								
Trunz	54	13	11.466					− 0.907
Königsberg	54	42	50.500	0	29	39.034	180402	− 1.448
Memel	55	43	40.446	1	30	28.980	551067	+ 2.355
9. *Russian Arcs.*								
Belin	52	2	40.864					− 1.732
Nemesch	54	39	4.519	2	36	23.655	951588	− 2.384
Jacobstadt	56	30	4.562	4	27	23.698	1627702	+ 1.826
Bristen	56	34	51.550	4	32	10.686	1656903	+ 2.627
Dorpat	58	22	47.280	6	20	6.416	2313721	− 1.044
Hochland	60	5	9.771	8	2	28.907	2937440	+ 0.607
10. *Svanberg's Swedish Arc.*								
Mallörn	65	31	30.265					+ 0.560
Pahtawara	67	8	49.830	1	37	19.565	593277	− 0.560

The elements of the elliptic spheroid of rotation deduced from the above data, and to which the above variations of latitude correspond, are as follows:—Let a denote half the greater axis of the meridian (or equatorial radius), b half the polar axis, ε the ellipticity, and e the eccentricity; then—

$a = 20923600.00$, $b = 20853657.16$ English feet.

$a : b = 299.1528 : 298.1528$,

$$\varepsilon = \frac{a-b}{a} = \frac{1}{299.1528} = .003342773,$$

$\log ee = 8.9122052$, $\log \sqrt{(1-ee)} = 9.9985458202$.

These elements agree so nearly as to be almost identical with those adopted by Mr. Airy, in his excellent treatise on the 'Figure of the Earth' ('Ency. Metropolitana'). The coincidence is the more remarkable, as Mr. Airy selected several arcs not included in the above table, and adopted a totally different method of combining them. He gives the equatorial radius = 20923713 feet, and the ratio of the axes 299.33 : 298.33.

On substituting Bessel's elements in the elliptic formulæ for the length of degrees of the meridian and the parallel circles, the following expressions are found:—Let l denote the latitude, m the length in feet of a degree of the meridian between the parallels whose latitudes are respectively $l-\frac{1}{2}$ and $l+\frac{1}{2}$, and p the length of a degree of the parallel whose latitude is l: then—

$m = 364575.6 - 1831.0 \cos 2l + 3.9 \cos 4l -$, &c.

$p = 365491 \cos l - 305.8 \cos 3l + 0.4 \cos 5l -$, &c.

Length of the quadrant of the meridian = 32811804 feet.

From the above formulæ we have computed the following table of the lengths of degrees of latitude and longitude in English feet:—

Latitude.	Degree of Meridian.	Degree of Parallel Circle.
0°	362748.5	365185.8
10	362858.0	359674.0
20	363173.7	343296.4
30	363658.1	316524.3
40	364254.0	280135.0
45	364575.6	258657.3
50	364889.9	235197.9
60	365489.1	183051.6
70	365978.9	125270.5
80	366299.2	63620.1
90	366410.5	0.0

TRIGONOMETRY. This word signifies the measurement of triangles, but we might as well attempt to confine geometry within etymological limits as trigonometry.

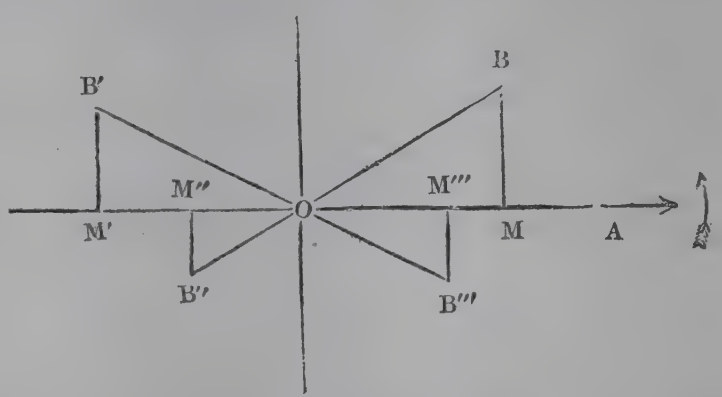
In the modern division of the mathematical

sciences, trigonometry, though still defined in books as the art of measuring triangles, really means the consideration of alternating or periodic magnitude; in which quantity is imagined to go through alterations of increase and diminution without end.

The most simple notion of periodic magnitude lies in supposing that the changes made are purely cyclical, or repetitions of the same for ever: as for instance, those which occur in turning a handle in a vertical plane. The number of revolutions traced out by the handle may be as great as we please, and the quantity of length of the circular arc described by its extremity may be as many times the circumference of the circle as we please, that is, as long as we please: but the distance of the handle from the ground is periodic, exhibiting perpetual increase and diminution as it rises and falls. Hence the circle naturally becomes a sort of standard of reference, and circular motion the primary idea, in all consideration of periodically changing magnitude. The arc, or the angle which it subtends at the centre, is the magnitude which increases without limit, all past revolutions being counted; and the lines which only depend on the position of the moving point in the circle, and not on the number of revolutions by which it has attained that position, are the periodic magnitudes in terms of which all others are expressed.

The periodic magnitudes connected with a varying angle, so far as they have separate designation, are the sine, cosine, tangent, cotangent, secant, cosecant, versed sine, coversed sine, and chord. A change is gradually taking place in the mode of conceiving these quantities, and one which it is very desirable to expedite: though slight in appearance, and producing no difference in results, it gives a great advantage in the consideration of formulæ. These elements *were* lines: they now often *are*, and in time always *will be*, the ratios of lines to lines.

From any point in the line O B (or O B′, &c.)



which is the variable boundary of the angle, draw B M (or B′M′, &c.) perpendicular to O A. Let O M and M B be positive, O M′ and M″B″, &c., negative, as in the usual method of reckoning co-ordinates. Call B M, B′M′, &c., opposite to the angles, O M, O M′, &c., adjacent; and let O B, O B′, &c., be called hypothenuses (and always considered positive). Then the sine of B O M is the fraction which B M is of O B, with its proper sign, in this case positive: but the sine of A O B″ is the fraction which M″B″ is of O B″, taken negatively, because M″B″ is negative. It is indifferent what hypothenuse is taken, by the property of similar triangles, and the following is the complete system of definitions, with the values written for the four angles. They give a slight degree more trouble at first, which is amply compensated in the superior ease with which all formulæ may be deduced, to say nothing of the advantage of avoiding the indefinite radius.

Definition.	A O B	A O B′	A O B″	A O B‴
Sine = $\frac{\text{Opp}^{e}.\text{ side}}{\text{hypothen.}}$	$\frac{\text{B M}}{\text{B O}}$	$\frac{\text{B′ M′}}{\text{B′ O}}$	$-\frac{\text{B″ M″}}{\text{B″ O}}$	$-\frac{\text{B‴ M‴}}{\text{B‴ O}}$
Cosine = $\frac{\text{Adj}^{t}.\text{ side}}{\text{hypothen.}}$	$\frac{\text{O M}}{\text{O B}}$	$\frac{\text{O M′}}{\text{O B′}}$	$-\frac{\text{O M″}}{\text{O B″}}$	$-\frac{\text{O M‴}}{\text{O B‴}}$
Tangent = $\frac{\text{Opp}^{e}.\text{ side}}{\text{Adj}^{t}.\text{ side}}$	$\frac{\text{M B}}{\text{M O}}$	$\frac{\text{M′ B′}}{\text{M′ O}}$	$-\frac{\text{M″ B″}}{\text{M″ O}}$	$-\frac{\text{M‴ B‴}}{\text{M‴ O}}$
Cotangent = $\frac{\text{Adj}^{t}.\text{ side}}{\text{Opp}^{e}.\text{ side}}$	$\frac{\text{M O}}{\text{M B}}$	$\frac{\text{M′ O}}{\text{M′ B′}}$	$-\frac{\text{M″ O}}{\text{M″ B″}}$	$-\frac{\text{M‴ O}}{\text{M‴ B‴}}$
Secant = $\frac{\text{Hypothen.}}{\text{Adj}^{t}.\text{ side}}$	$\frac{\text{O B}}{\text{O M}}$	$\frac{\text{O B′}}{\text{O M′}}$	$-\frac{\text{O B″}}{\text{O M″}}$	$-\frac{\text{O B‴}}{\text{O M‴}}$
Cosecant = $\frac{\text{Hypothen.}}{\text{Opp}^{e}.\text{ side}}$	$\frac{\text{B O}}{\text{B M}}$	$\frac{\text{B′ O}}{\text{B′ M′}}$	$-\frac{\text{B″ O}}{\text{B″ M″}}$	$-\frac{\text{B‴ O}}{\text{B‴ M‴}}$

Versed sine = unity − cosine.
Coversed sine = unity − sine.

The chord has long ceased to be regarded as one of the trigonometrical functions and is always used in its old sense, as the line joining the extremities of an arc.

TRILLIUM, a genus of plants belonging to the natural order *Melanthaceæ*. *T. erectum* has a large, dark, simple flower.

TRILOBITES, a race of extinct fossil animals. The older collectors, even of the present day, may remember the curiosity with which 'The Dudley Fossil,' as it was ordinarily termed, was regarded. By some zoologists it was treated of as an insect under the name of *Entomolithus paradoxus;* by others the form was considered as that of an extraordinary *Testacean* with a shell of three lobes; whilst others thought that the trilobitic remains belonged to animals closely approximated to the *Chitons*, or at least not differing greatly from them.

It is now agreed on all hands that *Trilobites* are *Crustaceans;* but their place in that class is hardly yet satisfactorily determined; at least those most conversant with the subject hold different opinions upon the point.

Dr. Buckland, in his 'Bridgewater Treatise,' speaks of the great extent to which Trilobites are distributed over the face of the globe, and their numerical abundance in the places where they have been discovered, as remarkable features in their history. He notices their occurrence at the most distant points both of the northern and southern hemisphere. They have been found all over Northern Europe, and in numerous localities in North America: in the southern hemisphere they occur in the Andes and at the Cape of Good Hope. No Trilobites have yet been found in any strata more recent than the carboniferous series; and no other crustaceans, except three forms which are also Entomostraceous, have been noticed in strata coeval with any of those that contain the remains of Trilobites: so that during the long periods that intervened between the deposition of the earliest fossiliferous strata and the termination of the coal-formation, the Trilobites appear to have been the chief representatives of a class which was largely multiplied into other orders and families after these earliest forms of marine crustaceans became extinct.

TRIM. [Meath.]

TRI'MERA, the fourth section of the order *Coleoptera* among insects, according to the arrangement of Latreille. The insects popularly known as Lady-Birds and Puff-Ball Beetles are characteristic of the families composing it.

The insects of this family are remarkable for brilliant colouring, being generally red or yellow, with black, red, white, or yellow spots. Individuals of the several species are so extremely variable and different from each other in their markings, as to render the construction of specific diagnoses in this family more difficult than in any other tribe of *Coleoptera*. Some have supposed that many of these varieties are hybrids between the sexes of different species, but M. Audoin maintains that the eggs produced from the union of allied species in the genus *Coccinella* are sterile. They creep slowly, but fly well, and many kinds are gregarious. Their eggs are deposited in yellow patches among the plant-lice, so that the larva is hatched in the midst of its food. They abound in our fields and gardens, and are among the first beetles which come out in spring. They appear sometimes in immense swarms and spreading over the fields cause needless alarm to the farmer, to whom, far from being a pest, they are a blessing, from the fierce war they wage against his enemies the Aphides.

'In 1807,' says Mr. Kirby, 'the shores at Brighton and all the watering-places on the south coast were literally covered with them, to the great surprise, and even alarm, of the inhabitants, who were ignorant that their little visitors were emigrants from the neighbouring hop-grounds, where in their larva state each had slain his thousands and tens of thousands of the *Aphis*, which, under the name of the *Fly*, so frequently blasts the hopes of the hop-grower.'

Some of the species are widely distributed, such as the very common *Coccinella septem-punctata*, which extends its range over all Europe and parts of Asia and Africa. In England we have six genera of *Coccinellidæ*, and more than fifty species.

It is doubtful whether all the insects of this tribe live on animal food. Mr. Darwin has observed them in places where they had no Aphides to eat. They are frequently found on the summits of mountains at a very great elevation, as high as 9000 feet, and aphides are scarce in such situations.

TRIMMER, SARAH, was born at Ipswich, Jan. 6, 1741. Her father, Mr. Joshua Kirby, is known as the author of 'Dr. Brooke Taylor's Method of Perspective made Easy,' and 'The Perspective of Architecture.' At the age of 21 Miss Kirby was married, to Mr. Trimmer. The first of her popular literary works was a small volume, entitled an 'Easy Introduction to the Knowledge of Nature,' 1780. It was followed, in 1782 and the following two years, by six volumes of 'Sacred History, selected from the Scriptures, with Annotations and Reflections adapted to the Comprehension of Young Persons.' The 'Family Magazine' was carried on for some time by Mrs. Trimmer, and the principal original papers were afterwards published as 'Instructive Tales.' Among her subsequent publications were some pictorial illustrations of Sacred History, &c., and a periodical called the 'Guardian of Education,' which extended to 5 vols. Her last work was a volume of selected 'Family Sermons.' She died, Dec. 15, 1810. In 1814 appeared, in two octavo volumes, an 'Account of the Life and Writings of Mrs. Trimmer.'

TRINCOMALEE, a fortified town and harbour on the east coast of the island of Ceylon, in 8° 32′ N. lat. and 81° 21′ E. long., is situated in the N.E. corner of Trincomalee Bay. This great inlet consists of six bays, besides several smaller bays and coves, Trincomalee Bay being in the centre. The harbour of Trincomalee, which for accommodation and safety is perhaps not surpassed by any in the world, is invaluable to the British as a naval station in the Indian seas. It has room enough for whole fleets; is landlocked by high ridges, and sheltered from all winds; has depth of water for the largest ships; and, what is of most importance, can be entered at all seasons during both monsoons. A ship from Madras can reach it in about two days.

The town and fortifications of Trincomalee are about three miles in circumference, but this includes much space not built upon. The inhabitants, who are not numerous, are chiefly Hindoos from Tanjore and the adjacent coast of Hindustan, with a few natives of Ceylon, and the British troops stationed there. The climate is hot; the mean temperature of the coolest months, when the N.E. monsoon prevails (April to October), is about 77°; the mean of the hottest, when the land-wind, or S.W. monsoon, blows, is about 83°. There is little export trade, the produce being hardly enough for the wants of the inhabitants, though the adjacent country was once populous, and exported grain and other provisions to the coasts of Hindustan. Many reservoirs and other works for irrigation and drainage are now in ruins and choked up: and swamps, jungles, and woods, abounding with wild hogs, buffaloes, and elephants, fill the atmosphere with malaria, and render the climate more unwholesome than the greater part of the rest of the island.

Trincomalee is about 95 miles from Kandy, and 165 miles from Colombo, direct distances. An excellent carriage-road has been carried across the island from Colombo to Trincomalee by the British; it was completed in 1833.

The Portuguese were the first to obtain possession of Trincomalee. The Dutch took it from the Portuguese in 1658, and retained it till 1782, when it was taken by a British fleet. Shortly afterwards it was retaken by the French, who delivered it to the Dutch; they held it till 1795, when it was surrendered, after a siege of three weeks, to the British.

TRING. [HERTFORDSHIRE.]

TRINGA. [TRINGINÆ.]

TRINGI'NÆ. In the article SCOLOPACIDÆ will be found some general views as to the place of the Sandpipers (*Tringa*, Linn.), many of which are arranged within the subfamily *Totaninæ*. Here it remains for us to notice a few examples of the genus *Tringa* of authors (including the subgenera *Pelidna* and *Calidris*, Cuv.), as separated from *Totanus*, *Machetes*, *Strepsilas*, *Vanellus*, &c., which constitute the Linnæan genus *Tringa*. [PLOVERS.]

Selby, in his genus *Tringa*, includes the Pigmy Curlew of Pennant (*Numenius pygmæus* or *subarquatus*), a bird which, Mr. Yarrell observes, constitutes a link between the true Snipes and the true Sandpipers, or Marine Snipes, most of which frequent and obtain their living on the sandy shores of the sea. Excluding this species, Selby's British Tringæ consist of the following species, the Knot (*Tringa canutus; Calidris canutus*, Cuv.), the Buff-Breasted Tringa (*Tr. rufescens*, Vieill.), Temminck's *Tringa* (*Tr. Temminckii*, Leisler), the Minute Tringa (*Tr. minuta*, Leisler), the Rock Tringa (*Tr. maritima*, Brunich), and the Dunlin or Purre (*T. variabilis*, Meyer). These species all inhabit 'marine marshes and shores, though some habitually frequent the margins of lakes and the rivers of the interior. They associate and live in flocks, and perform their periodical migrations in large bodies. Their moult is double, that is the plumage is renewed twice in the year, and the summer or nuptial livery is very different from that in which they are clothed during the rest of the year. The principal variations of colour are from white to reddish brown, and from gray to black.' These frequent and peculiar changes, as in other genera of the *Scolopacidæ*, have led to great confusion, and the false multiplication of species. As examples, we select the Knot, and the Little Sandpiper.

The Knot is the *Tringa cinerea, grisea*, and *canutus* of Linnæus and Gmelin; *Calidris canutus* of Cuvier; the *Maubèche grise*, *Maubèche tachetée*, and *Le Canut* of the French; *Chiurlo*, *Piovanello maggiore*, and *Paginella maggiore* of the Italians; *Rothbraune Strandlaufer*, *Aschgraus Strandlaufer*, and *Hochköpfige Strandlaufer* of the Germans.

Several other scientific names have been given to the bird according to the different stages of its plumage, such stages having been mistaken by the describers for specific differences.

Geographical Distribution.—Iceland, Greenland, North Georgian Islands, Duke of York's Bay, Melville Peninsula (where they were seen breeding), Hudson's Bay (where they breed), and down to the 55th parallel, Sweden and Norway, Holland in spring and autumn, the British Islands (but not known to breed there), rare in Germany, France, and the south of Europe.

Nest, Habits, Food, &c.—According to Captain Lyon, who saw it breeding in Melville Peninsula, the Knot lays four eggs on a tuft of withered grass, without forming any nest. The eggs are of a light yellowish brown, spotted with gray and reddish at the larger end, so as to form a sort of zone more or less: there are but few spots towards the point. In the autumn the Knots appear on the eastern coasts of England in great numbers, and are to be found also in most of the southern counties. They are regular visitors to Ireland. Mr. Yarrell states that he is not aware of any record of the Knot breeding in the British Islands, nor does he know of any British collection that contains its eggs.

The food of the Knot consists principally of worms, and also, occasionally, of small river and marsh insects, little marine crustaceans, and very small bivalve mollusks.

Utility to Man.—One of the most delicious of birds, and, when fattened, preferred by epicures to the luscious ruff. 'They are taken,' says Pennant, 'in great numbers on the coasts of Lincolnshire, in nets such as are employed in taking ruffs. With two or three dozen of *stales* of wood painted like the birds, placed within, fourteen dozen have been taken at once. Their season is from the beginning of August to the end of November. They disappear with the first frosts. Camden says they derive their name from King Canute, Knute, or Knout, as he is sometimes called.

The *Little Sandpiper.*—This, which is the smallest British Sandpiper, with one exception (Temminck's Tringa), is the *Tringa minuta* of Leisler, the *Tringa pusilla* of Linnæus, Latham, and Pennant, the *Stint* of Bewick, the *Tringa minuta* of Fleming, the *Minute Tringa* of Selby, the *Little Stint* of Jenyns, and the *Pigmy Sand-*

piper of Richardson. It is the *Gambecchio* and *Culetto* of the Italians; *Der Hochbeinige Strandlaufer* and *Der Kleine Schlammlaufer* and *Zwerg Schlammlaufer* of the Germans.

This species is migratory; it breeds in the high northern latitudes, whence on the approach of winter it migrates southward, and is found throughout Europe and Asia generally, and some parts of Africa, frequenting the banks of lakes, large rivers, and salt marshes, as well as the flat sea-coast. In general habits and manners it resembles the Knot. Of its nidification nothing is known. According to Mr. Gould its eggs resemble those of the Common Sandpiper, except in being much smaller.

TRI'NIA, a genus of plants belonging to the natural order *Umbelliferæ*. The species, which are not numerous, have been referred to *Pimpinella* and *Seseli*, but the dicœcious flowers and the difference between the structure of the petals in the barren and fertile flowers render it very distinct. One of this species, the *Trinia glaberrima*, Smooth Honewort, is an inhabitant of Great Britain, but must be looked upon as a rarity. It has been found on limestone in Somersetshire, Cornwall, and Devonshire.

TRINIDAD, an island belonging to England in the Columbian archipelago, between 10° 5′ and 10° 50′ N. lat. and 61° and 62° W. long. It is separated from South America by the Gulf of Paria, which forms an immense harbour with good anchorage, and is about 100 miles long by 40 in average breadth. Trinidad is about 50 miles long from south to north, 30 miles broad in the centre, and contains 2020 square miles. The western coast is low, and either sandy or swampy, but the three other sides are rocky and elevated. A chain of mountains, which occupies a breadth of about 10 miles, and whose highest points vary from 1800 to 2400 feet, runs along the northern side of the island, close to the sea. Southward of the mountains is a plain watered by two considerable rivers; then occurs a range of hills, then another plain, and lastly, a chain of hills near the south coast. The most remarkable natural feature of Trinidad is the Pitch Lake. It is about a mile and a half in circumference. 'The pitch at the sides of the lake is perfectly hard and cold, but as one walks towards the middle with the shoes off in order to wade through the water, the heat gradually increases, the pitch becomes softer and softer, until at last it is seen boiling up in a liquid state. The air is then strongly impregnated with bitumen and sulphur, and the impression of the feet is left upon the surface of the pitch. During the rainy season it is possible to walk over the whole lake nearly; but in the hot season a great part is not to be approached.' (Sir J. Alexander, in Martin's 'Colonies,' vol. ii., p. 235.)

Trinidad possesses some excellent harbours: Chaguaramas, Guaya-guayara, and Puerta d'España. On the last named stands the town called the Port of Spain, the capital of the island. Trinidad is not visited by hurricanes.

Trinidad was discovered by Columbus in 1498, when it contained a numerous aboriginal population. It was first colonised in 1588, by the Spaniards; in 1676 it was taken by the French, but almost immediately restored, and in 1797 it was taken by the British, and has since remained in our possession. The number of slaves in 1834 was 20,657, and their owners received a sum of 1,033,992*l.*, or rather more than 50*l.* a-head, as compensation, when slavery was abolished. The number of free blacks and persons of colour in 1834 was 18,724. Since 1834 there has been a great addition to the population. The island is divided into 37 counties or districts. Port of Spain, the capital, is one of the finest towns in the West Indies, and contains a population of about 12,000. The houses are built of stone and on a regular plan, and wooden houses are not allowed to be erected. A lighthouse was built here in 1842. There have recently been built a new government house, court house, rector's house, and police office.

Before 1783 the commerce of Trinidad was very trifling. In 1787 the first sugar-plantation was established. All the usual productions of tropical countries grow luxuriantly. The nutmeg, cinnamon, and clove have been introduced, and succeed remarkably well. In 1848 the exports amounted to 282,131*l.*, the imports to 309,257*l.*, and the revenue to 75,874*l.* Sugar, molasses, coffee, and cocoa, are chief articles of export.

TRINITY (Greek, τριὰς; Latin *trinitas*, or *trinunitas*) is a word used by theologians to describe the Divine Being as consisting of three persons united in one God.

On the Scriptural View of the Trinity.—The difference between those who receive the doctrine and those who reject it of course resolves itself into a number of questions in biblical criticism. Referring to the article UNITARIANS for the opinions of the latter party, we proceed to state the views generally held by the former of the scriptural statements concerning the Trinity.

In the Old Testament this doctrine cannot be said to hold a prominent place. The great doctrine therein taught is the unity of God as opposed to polytheism. This point having been clearly revealed in the books of the Old Testament, and having been practically inculcated in the history of the people of Israel, a further revelation of the nature of God was made by Christianity, namely, that in this one only God were mysteriously united three distinct persons, each of them divine. But yet there are passages of the Old Testament in which this doctrine is generally thought to be obscurely revealed or incidentally implied.

The scriptural argument for the Trinity may be stated in the following manner:—Besides the many passages of the New Testament in which one supreme being (God) is spoken of, there are many others in which mention is made of the Father, the Son, and the Holy Spirit, or the Spirit of God, whose distinct personality is clear from the manner in which they are spoken of. To these three persons divine attributes are ascribed where they are mentioned together, and also to each of them singly. Hence the scriptural proof of the doctrine of the Trinity is twofold: being derived, first, from passages in which the Father, Son, and Holy Spirit are mentioned together as God; and secondly, from passages which

prove each of them to be divine. Of the former class of passages, two of the most remarkable are the baptismal formulary (Matt., xxviii. 19), and the apostolic benediction (2 Cor., xiii. 13), to which may be added a great part of the 14th, 15th, and 16th chapters of John's gospel, and several other passages in the gospels, and also 1 Cor., xii. 3-6; Titus, iii. 4-6; 1 Pet., i. 2-3. A striking declaration of the same truth is generally thought to be set forth in the circumstances which attended the baptism of Christ (Matt., iii. 16-17; Luke, iii. 21-22; John, i. 32-34). The passage in 1 John, v. 7-8, is now pronounced to be spurious by the almost universal consent of biblical scholars.

Besides this general assertion of the union of the Father, the Son, and the Holy Ghost, in the Godhead, the following passages are produced to prove separately the personality and the divinity of the Father: John, i. 14, 18; v. 17, 18; xvi. 26, &c.; Heb., i. 2-5; Rom., xv. 6; 1 Cor., i. 3; Ephes., iii. 14; and the following, in which 'the Father' is also expressly called 'God:' John, vi. 44-46; xx. 17; Ephes., i. 17; 1 Pet., i. 2; Rev., i. 6. In all these passages the word *Father* is used with reference to the relation of the Father to the Son. Those passages in which God is called *the Father*, in reference to created beings, are scarcely in point here.

The personality and Godhead of the Son are proved by the assertions of Christ respecting his own nature, whether he is speaking of himself directly, or under the names of 'Son of God' and 'Son of Man,' and by the similar statements of the sacred writers. Thus his person is described as consisting of two parts, the one human, and the other superhuman (John, iii. 11, 13; vi. and viii., passim; and compare John, i. 15, 30; iii. 31, &c.; 1 Cor., xv. 47-49; Rom., i. 3; ix. 5; 1 Tim., iii. 16; Heb., ii. 17). He is declared to possess an eternal existence (John, i. 1-3; xvii. 5, 24; 1 John, i. 2, 5, 20; Heb., i. 10-12; Rev., xxii. 13). To him are ascribed the divine attributes of Omnipotence (John, v. 19; x. 18; xiv. 13; Matt., xi. 27; xxviii. 18; Luke, xxi. 15; Rom., xv. 18; 2 Cor., xii. 9; Phil., iii. 21; 1 Pet., iii. 22; 2 Pet., i. 3), and Omniscience (Matt., xi. 27; John, vi. 46; xiv. 13, 14; Acts, i. 24; 1 Cor., iv. 5). His nature is expressly said to be divine, equal to, and one with God. (John, v. 18, 26; x. 28; Phil., ii. 6; Col., ii. 9.) In his person God is declared to be clearly seen (John, xiv. 9), so that he is called the 'image' (εἰκὼν) of God (Col., i. 15; 2 Cor., iv. 4), the 'splendour of his glory, and the exact counterpart of his person.' (Heb., i. 3.) Works are ascribed to him which can only be performed by a divine being: such as the creating, upholding, and governing of the world (John, i. 3, 10; Col., i. 16, &c.; 1 Cor., viii. 6; Heb., i. 2, 3, 10; Matt., xi. 27, 28; xviii. 20; Mark, xvi. 19; John, xvii. 2), the resurrection of the dead, and the last judgment (John, v. 21, &c.; Matt., vii. 22, &c.; x. 32; xxv. 31, &c.; Phil., iii. 20). Titles are given and worship paid to him, such as belong to God alone. (1 Cor., ii. 8; Rom., xiv. 9; Phil., ii. 10; 1 Pet., iii. 22; Rev., xvii. 14; xix. 16; John, v. 23; Matt., xxviii. 19; Phil., ii. 10; Heb., i. 6; Rev., v. 13; Acts, i. 24; vii. 59; Rom., ix. 1; x. 12; 1 Cor., i. 2; 2 Cor., xii. 8; Heb., iv. 16; Rev., v. 8-14; vii. 12.) His nature is as unsearchable to man as that of the Father. (Matt., xi. 27; Luke, x. 22; John, x. 15.) Lastly, he is expressly called God (John, i. 1; xx. 28; Rom., ix. 5; Tit., ii. 13; Luke, i. 16, 17; Acts, xx. 28; 1 Tim., iii. 16; Heb., i. 8; Rev., i. 8; xxii. 6.)

The argument for the personality and divinity of the Holy Spirit is of a similar character, and rests chiefly on the following passages:—Rom., viii. 26, &c.; Ephes., iv. 30; 1 Cor., xii. 8, &c.; 1 Pet., i. 10, &c.; 2 Pet., i. 21; John, iii. 3; Rom., viii. 14; 1 Cor., ii. 12; iii. 16; vi. 11, 19; 2 Cor., i. 22; Ephes., i. 13, &c.; iv. 6, 30; Gal., iii. 14, 26; v. 18, 22; 2 Tim., i. 7; Acts, xx. 28; 1 Pet., i. 12; 1 Cor., ii. 10; John, xvi. 7-13; Acts, v. 3, 4; 1 Cor., vi. 19; 2 Cor., vi. 16.

Though the Scriptures furnish us with no systematic account of the relations which the three persons of the Trinity respectively sustain to each other and to created beings, yet they contain statements and illustrations, which must form the basis of every attempt to explain this most difficult subject. Thus, besides the relations implied in the names Father, Son or Word, Spirit of God or Holy Spirit, we are expressly informed respecting the Father, that he is the source of all being and life (1 Cor., viii. 6); that he is invisible and incomprehensible, except as revealed by and through the Son (John, i. 18; vi. 46; comp. 1 John, iv. 12; 1 Tim., vi. 16); that his very essence is love, and that his love is manifested to men in the incarnation of the Son (John, iii. 16-17; 1 John, iv. 8, 16). Every visible and sensible revelation of the Godhead to created beings has been made from all eternity through the Son, who is called the first and only begotten, the Son of the Father's love, and in whom the whole fulness of the Godhead is said to be contained. (Col., i. 13; John, iii. 16; x. 36; Rom., viii. 32; Ephes., i. 6; Mark, xii. 6; xiv. 61; 1 John, iv. 15; v. 9-12; Col., ii. 9; and several other passages.) The Holy Spirit is said to be sent forth by or to proceed from the Father and the Son, and to honour the Son and reveal him to men. (John, xvi.; 1 Cor., xii. 3; and other passages.)

The fact deserves especial notice, that in the biblical statement of this doctrine no attempt is made to reveal to us what constitutes the substance or essence of the Divine Being, or what is the mode in which three distinct persons are united in that substance. But little reflection is necessary to see the reason of this: we could not have understood such an explanation had it been made, even if human language could have furnished the means of expressing it, which is more than doubtful.

TRINITY COLLEGE, CAMBRIDGE. Two colleges formerly existed upon the site of Trinity College: the one named Michael House, dedicated to Michael the Archangel, was founded in 1324, by Harvey de Stanton, chancellor of the exchequer to King Edward II.; the other was King's Hall, founded in 1337 by King Edward III.

Both were resigned into the king's hands in 1546 by the respective masters, and their lands in the same year made part of the endowment of a new college founded by King Henry VIII., under the name of Trinity College. The king appointed his college to consist of a Master and 60 Fellows. Queen Mary increased the endowment, for the maintenance of 20 scholars, 10 choristers and their master, 4 chaplains, 13 poor scholars, and 2 sizars. Several other scholarships have been added; the present number is 69. There are 16 sizars upon the foundation.

The government of the college is vested in the master and the 8 senior fellows. The master is appointed by the crown. The fellows are chosen from the scholars, who are ineligible if they are M.A., or of sufficient standing to take that degree. All persons who are British subjects are eligible to a scholarship or a fellowship. There are many exhibitions, and numerous annual prizes are distributed, chiefly for literary compositions.

Trinity College is situated between St. John's College and Caius College, occupying the space between Trumpington Street and the river Cam. It consists of three courts of unequal dimensions. The outer and larger court is entered from Trumpington Street by a turreted gateway, said to have been formerly the entrance to King's Hall. The inner court is called Neville's Court, from Thomas Neville, master of the college and dean of Canterbury, by whose benefaction the principal part of it was built. The library, which now forms the west side, is of later date, and was designed by Sir Christopher Wren. A third court, adjoining Neville's Court, was completed in 1825. The chapel was begun by Queen Mary, and finished by Queen Elizabeth. In the ante-chapel is a statue of Sir Isaac Newton, by Roubiliac. The hall, which is about 100 feet in length, is in the mixed style of architecture which began in the reign of Henry VIII. The Master's Lodge, which contains several spacious apartments, has always, since the time of Queen Elizabeth, been the residence of the king when the university has been honoured with a royal visit; and the judges always lodge there during the assizes.

The number of members on the boards in 1848 was 2179.

TRINITY COLLEGE, OXFORD. This college was originally founded and endowed by Edward III., Richard II., and the priors and bishops of Durham. As it was under the patronage of the bishops of Durham, it obtained the name of Durham College, though dedicated from the beginning to the Holy Trinity, St. Mary, and St. Cuthbert. At the Reformation it was suppressed. Sir Thomas Pope, Knt., of Tittenhanger, in Hertfordshire, Feb. 20, 1554-5, purchased the site and buildings, and founded the present college, dedicated to the 'holy and undivided Trinity,' for a President, 12 Fellows, and 12 scholars.

The founder directs that the scholars shall be chosen from his manors; but if no such candidates properly qualified appear on the day of election (Trinity Monday), that then they shall be supplied from any county in England.

There is also a scholarship, nearly coeval with Sir Thomas Pope's foundation, founded by Richard Blount, Esq., of the city of London, and there are 3 exhibitions.

The original buildings of this college were those which belonged to Durham College, and were repaired by Sir Thomas Pope for the use of his society. During the great rebellion the buildings became ruinous; and in 1664 Dr. Bathurst, then president, began to repair the quadrangle, which he completed in 1687, at his own expense. Soon after a new court of three sides was projected in the Fellows' Garden, and was completed in 1728. Sir Christopher Wren was the architect employed on this court. The hall, on the west side of the quadrangle, having fallen into decay, was rebuilt in 1618. The library, though it has undergone various changes, is in substance the oldest part of the college, having been erected in 1370. The present chapel, originally that of Durham College, was erected between 1691 and 1694.

The number of members on the books in 1848 was 298.

TRINITY HALL, CAMBRIDGE, was founded in 1350, by William Bateman, bishop of Norwich. It is now more peculiarly appropriated to the study of Civil Law, and has 12 open Fellowships. There are also 15 Scholarships. This college, which is situated near the river Cam, between Clare Hall and Gerrard-Hostel Lane, consists of a small neat court faced with stone. The old hall was demolished in 1742. The number of members on the boards in 1848 was 145.

TRINITY HOUSE OF DEPTFORD STROND, *the Corporation of*, a society which has the management of some of the most important interests of the seamen and shipping of England. The earlier records, together with the house of the corporation, were destroyed by fire in 1714. The earliest official document relating to the Trinity House now extant is a charter of incorporation by Henry VIII. in the 6th year of his reign.

James II. granted the Trinity House the charter which is now in force, in the first year of his reign. It recites the former grant and charter, and declares the body to be a corporation, and that it shall consist of one master, and one deputy master, four wardens, and four deputy wardens, eight assistants, and eight deputy assistants, eighteen elder brethren, and a clerk. It determines the mode of election of those officers, their continuance in office, and the mode of removing them from it, if necessary; and declares that all seamen and mariners belonging to the guild shall be younger brethren. It directs the masters and wardens to examine such boys of Christ's Hospital as shall be willing to become seamen, and to apprentice them to commanders of ships. It also enables them to appoint and license all pilots into and out of the Thames, and prohibits under penalties all other persons from exercising that office; it also authorises the corporation to settle rates of pilotage, &c., to hold courts, &c., to punish seamen deserting, &c., and make laws as to their subject-matters not inconsistent with the laws of the kingdom. It also contains many provisions directed to the object of keeping the navigation of the channels secret from

foreigners, and renders the officers of the corporation liable to attend when required at the king's bidding. Since that time several acts of parliament have been passed for the purpose of authorising the Trinity House to regulate matters connected with the pilotage, &c., of vessels.

The various provisions in matters of pilotage under the management of the corporation were repealed by the 6 Geo. IV., c. 125, entitled 'An Act for the Amendment of the Law respecting Pilots and Pilotage, and for the better Preservation of floating Lights, Buoys, and Beacons,' which contains a variety of minute regulations respecting the examination, licensing, and employment of pilots, the rates of pilotage, provisions for decayed pilots, the protection of buoys, &c. At present however, besides those under the jurisdiction of the Trinity House and of the lord warden of the Cinque Ports, many independent pilotage establishments exist in various parts of the kingdom; but the expediency of subjecting all these to the uniform management of the Trinity House has been felt for some time past. The inconvenience resulting from the exercise of similar authorities vested in the hands of different parties had been felt with regard to the lighthouses on the coast, several of which had been vested in private hands by the crown; while some had been in times past leased out by the corporation itself, the lights in both instances being found to be conducted probably rather with a view to private interest than public utility. By an Act therefore of the 6 & 7 Wm. IV., c. 79, passed 'in order to the attainment of uniformity of system in the management of lighthouses, and the reduction and equalisation of the tolls payable in respect thereof,' provision was made for vesting all the lighthouses and lights on the coast of England in the corporation of Trinity House, and placing those of Scotland and Ireland under their supervision. Under this Act purchases have been made by the corporation of the whole of the lighthouses not before possessed by that body, the amount expended for which purpose is near 1,000,000*l*.

The annual revenue of the corporation is very considerable, and is derived from tolls paid in respect of shipping, which receives benefit from the lights, beacons, and buoys, and from the ballast supplied. The ballast is raised from such parts of the bed of the river as it is expedient to deepen, by machinery attached to vessels, and worked partly by the power of steam and partly by manual labour. The remainder of the revenue proceeds from lands, stock, &c., held by the corporation, partly by purchase, partly from legacies, &c., and donations of individuals. The whole is employed upon the necessary expenses of the corporation in constructing and maintaining their lighthouses and lights, beacons and buoys, and the buildings and vessels belonging to the corporation; in paying the necessary officers of their several establishments, and in providing relief for decayed seamen and ballastmen, their widows, &c. Many almshouses have also at various times been erected, which are maintained from the same funds. The present house of the corporation is on Tower Hill. There are thirty-one Elder Brethren. The Younger Brethren (who are unlimited in number) are or have been commanders of merchant ships. Neither the honorary members nor the Younger Brethren derive any pecuniary advantage from their connection with the corporation. Two of the Elder Brethren sit as assistants to the judge in the court of admiralty in almost all cases where any question upon navigation is likely to arise. The various duties of the corporation are parcelled out among the wardens and different committees appointed for the purpose of discharging the same. The deputy master and Elder Brethren are employed on voyages of inspection of their lighthouses and lights, beacons and buoys, not unfrequently in most trying weather and seasons; and they are also often engaged in making surveys, &c., on the coast, and reports on such matters of maritime character as are referred to them by the government. The sums paid to the deputy-master and Elder Brethren for their services are—to the former 500*l*. per annum, and 100*l*. further as the chairman of all committees, and to each of the Elder Brethren 300*l*. per annum.

TRINO. [NOVARA.]

TRINOMIAL, the algebraical name for an expression which consists of three terms, as $a + b + c$, or $ax - bx^3 + bx^4$.

TRIO'DIA, the name of a genus of plants belonging to the natural order *Graminaceæ*. The species of this genus of plants are principally natives of New Holland; one only is a native of Europe, and is also found in great abundance in Britain. *T. decumbens*, Decumbent Heath-Grass, is an abundant plant on wet mountain-pastures, and on heaths and moors. It is about a foot high, and is one of those grasses which will grow abundantly on poor wet soils. Animals do not however appear to be fond of it.

TRIO'STEUM, a genus of plants belonging to the natural order *Caprifoliaceæ*. The species are permanent herbs, rarely suffruticose. *T. perfoliatum*, Feverwort, is a native of North America, in the United States, on rich grounds, particularly in limestone soil.

TRIPHA'SIA, a small genus of plants of the natural family of *Aurantiaceæ*, of which the species are found in the East Indies, Cochin-China, and China. The fruit of *T. trifoliata* is acid in taste, something like the orange, and is both preserved and eaten as a fruit.

TRIPLICATE. In the common arithmetical sense, the triplicate of a given ratio is found by taking the cube of each of the terms of the ratio. Thus when we say that two similarly-formed solids, whose linear dimensions are as 4 to 7, are in the triplicate ratio of 4 to 7, it is meant that the bulks of those solids are in the ratio of $4 \times 4 \times 4$ to $7 \times 7 \times 7$, or of 64 to 343.

TRIPOD (*tripos*, τρίπους) is any article of furniture resting upon three feet, whence the name is given to tables, chairs, moveable altars, and other articles of the same kind. A chair or an altar of this kind must be understood when we read that the Pythia of Delphi gave her oracles from a tripod. We find also mention of tripods containing a certain measure of fluid (Hom., 'Iliad,' xxiii. 264), and in this case we have to understand a bowl resting upon a pedestal with three feet.

The crater, or the vessel in which the wine was mixed with water at the banquets of the ancients, was very frequently a tripod of this description. The tripod was generally of metal and often of exquisite workmanship.

Tripods were the most common presents to the temples of Apollo, tripods were given to the victors in the games which were celebrated in honour of Apollo, and tripods appear on innumerable coins which have any relation to the worship of that god. Some ancient tripods are preserved in the British Museum.

TRIPOLI is a country in Northern Africa, which extends along the southern shores of the Mediterranean, from 11° to 25° E. long. On all other sides it is surrounded by countries which form portions of the Sahara, or Great Desert, or are unfit for cultivation. The width from north to south cannot be definitely stated.

Coast-line and Harbours.—West of the town of Tripoli the coast is low and sandy, and contains no harbour except that of Old Tripoli, which is almost choked up with sand. Tripoli itself is a good harbour. The low and sandy coast continues eastward of the town as far as Cape Sciarra, and contains no harbour. Eastward of Cape Sciarra the coast is higher, and consists of rocky points and capes, with sandy bays between them, a few of which afford shelter for small vessels. The Gulf of Sidra (anciently the Greater Syrtis) occurs about the middle of the coast line; it is 280 miles wide, and its greatest extent inland is about 120 miles. Bengazi, which is situated at the eastern entrance of the Gulf of Sidra, has a safe port, which however is fast filling up with sand. [BARCA.] The coast from Bengazi eastward to the limits of the territory is at first for the most part low and sandy, but farther to the east becomes high and rocky. It contains the bays of Ptolemeta, Susa Hammám (near which are the ruins of the ancient town of Apollonia), Hilal, Derna, and Bombah.

The coast-line of Tripoli probably exceeds a thousand miles, and hardly contains three or four harbours in which vessels of moderate size can find tolerable shelter. There is perhaps no other coast-line on the globe of equal extent which is so little favourable to intercourse with countries by sea.

Surface and Soil.—We are very imperfectly acquainted with the interior of Tripoli. Two ranges of mountains traverse the western part of the country from W.N.W. to E.S.E., running nearly parallel to the sea. The northern of these two ranges is called the Gharian Mountains, and is visible from the sea, being only from 15 to 20 miles distant from it. The southern range is supposed to be about 30 miles farther to the south, and is called the Sudah Mountains. Some of the Gharian Mountains attain an elevation of 4000 feet. Several minor ridges branch off from the eastern portion of this range on its northern side, and approach close to the Mediterranean between Cape Sciarra and the ruins of the town of Lebda. The Gharian Mountains, south of Tripoli, occupy a tract 12 or 15 miles in width. There is much corn and fruit produced among these mountains; but a considerable portion of this tract is used as pasture-grounds. The inhabitants of the Gharian Mountains live mostly under ground, in caves which have been dug for the purpose. A low table-land to the E. of the Gharian Mountains, in approaching the Gulf of Sidra, splits into several short ranges of hills, which fill up the space between Cape Sciarra and the town of Mesurata, and in many places come close up to the sea; many very fertile spots are here met with. The country south of the table-land, extending to the Sudah Mountains, contains a much smaller portion of cultivated ground than that north of it. Its surface presents a succession of several wide depressions, running from west to east, and terminating on the east in the low grounds which extend along the western shores of the Gulf of Sidra. From each of these wide valleys smaller valleys branch off, and penetrate a few miles into the higher grounds, which enclose them. The habitable portion of this region is limited to the depressions, where several villages are found close together, whilst all the other parts are uninhabited.

Near the western shore of the Gulf of Sidra is a marsh nearly 100 miles in length, forming the worst portion of the coast. A very sterile country also encloses the bottom of the gulf. The eastern side has districts of a more favourable character. The country east of the gulf is generally known by the name of *Barca*, and was known to the ancients as *Cyrenaica*. It comprehends the country which, between 20° and 23° E. long., projects into the Mediterranean nearly in the form of a semicircle, and the countries lying south of it as far as about 29° N. lat. It is supposed that the greater portion of it is mountainous. On the west, a range of mountains in Barca is separated from the shores of the Gulf of Sidra by a low plain. This plain, which is called the Plain of Bengazi, from the town of that name, extends along the eastern shores of the Gulf of Sidra, from Braiga to Ptolemeta, a distance of about 180 miles in a straight line. Many portions of this plain are fertile. The mountain-region of Barca is an elevated table-land, with a surface generally hilly, fertile in its western part, and somewhat sterile in its eastern. There are three oases south of the table-land, Augila, Jalloo, and Leshkeneh, which contain together about 10,000 inhabitants. There are three smaller oases between Augila and the south extremity of the Gulf of Sidra.

Productions.—In those parts of the country which are moderately fertile, a variety of grain, fruit, and trees, is met with. The wild trees and bushes are only used to make charcoal. Where charcoal is not to be had, camel's dung is used as fuel.

Cattle are not numerous in Tripoli, except in Barca, where great numbers are found on the table-land, whence they are sent to Bengazi to be shipped for Malta and other places. The domestic animals are horses, camels, sheep, goats, dogs, and poultry. The horses are of a fine breed. The most common wild animals of prey are wolves, foxes, hyænas, and jackals. There are antelopes, gazelles, and hares. Ostriches are only found in the deserts, especially south of the mountain-region of Barca. Metals do not appear to be found. Salt is collected at a few places.

Inhabitants.—Geographers have commonly estimated the population of Tripoli at 1,000,000; but this estimate is certainly below the truth, and was made when a great part of the country was unknown: it is more probable that the population is not less than 2,000,000.

The Arabs of Tripoli, who compose the bulk of the people, are of the same stock as the Beduins of Arabia. There are two tribes or bodies of them; one wanderers, the other fixed residents in villages and small towns. Jews are numerous in the towns and in the villages of the Arabs. The Moors are either landed proprietors or merchants. As merchants they are mostly engaged in the cafilas which go to Fezzan and Bornou. They resemble exactly the Moors of Marocco. The number of Turks and Mamelukes has increased since the country has again become dependent on Constantinople. They are either officers of government or serve as soldiers. Christians are only found in the town of Tripoli, where they are better treated than in any other place in the Turkish dominions. The black slaves, who are mostly kept by the Moors, are nearly all natives of Soodan.

Government.—The Pashalic of Tripoli, like the other Barbary states, is a despotism; and whether ruled by a Turkish or Moorish chief, is held chiefly for the purpose of exacting a revenue, with little regard to the prosperity of the country. A considerable sum was formerly drawn from the plunder obtained by her corsairs, and a very lucrative branch of it was derived from the traffic in European slaves; but piracy is now abolished. To supply this deficiency the country is burthened with monopolies, and the people are oppressed with taxes. The distant beys of Bengazi and Derna, holding their office at the pleasure of the pasha, make the most of their uncertain tenure by arbitrary exactions for themselves, as well as to enable them to comply with their master's demands; while the sheiks of Barca and Sert pay likewise a tribute, in return for which their power is acknowledged in the Desert. Thus the system throughout is one of extortion.

History.—The early history of this country will be found under the heads Africa, Barbary, Barca, Cyrenaica. After the destruction of Carthage it became a Roman province, and the three flourishing cities of Œa, Leptis, and Sabrata constituted a kind of federal union under the name of Tripolis. On the conquest of northern Africa by the Vandals in the fifth century, it passed into the hands of those barbarians, from whom it was rescued in the reign of Justinian, by Belisarius in 534. About a hundred years afterwards it yielded to the power of the caliphs. After the Arabian conquerors had consolidated their power in northern Africa, and detached themselves from the caliphs of Egypt, Tripoli was generally governed by the Arabian dynasties settled at Cairoan; but from its nearer vicinity to Egypt it was more liable to inroads from this quarter. In 1184 it became subject to the kings of Tunis. In 1510 it was conquered by the Spaniards. In 1530 the Emperor Charles V. ceded the town of Tripoli, with the island of Malta, to the Knights of St. John of Jerusalem, after their expulsion from Rhodes. Its only strength was then a castle, which they engaged to keep and to hold in defence of Christendom; but in 1551 it was wrested from them by the Turks; and about that time its present walls were built, and the tract of country now composing the regency was first made a Turkish pashalic. Tripoli now became one of those systematic piratical powers who for centuries attacked the commerce of Christian nations, making slaves of their prisoners. In 1816 piracy was abolished. Previous to the attack in that year on Algiers, a British naval force appeared off Tripoli, and the pasha bound himself to treat all prisoners in future according to the usage of European nations. For the last 300 years Tripoli, like the other Barbary states, has been considered a dependency of the Ottoman Porte.

Antiquities.—Most of the towns in the regency possess interesting remains, which are as yet but imperfectly known, particularly in the Pentápolis, where innumerable chambers are hewn out of the rocky hills throughout; some of them with architectural elevations, sculpture, and inscriptions. The ruins of temples, theatres, and aqueducts of Roman construction are particularly traceable at Ghrenna (Cyréne), Tauchira (Arsinoë), Ptolemeta (Ptolemais), and Marsa Susa (Apollonia). Lébda (Leptis Magna) has been spoiled of a vast number of antiquities. At Tripoli Vecchia there is an amphitheatre of Roman construction still entire, 148 feet in diameter, with five degrees of seats; and in the same direction still exists the remnant of one of the great Roman ways, on the borders of which are observable the ruins of ancient buildings in stone.

TRI'POLI, a city and port of the Mediterranean, on the northern coast of Africa, which gives its name to one of the regencies of Barbary. Its castle is in 32° 53′ 56″ N. lat., and 13° 10′ 58″ E. long. It is the capital of the state and the residence of the pasha.

The town is built upon a rocky promontory which stretches a short distance into the sea, which washes it to the northward on two sides, while the south and west sides are bounded by a sandy plain which is partly cultivated. It is defended by a castle, whose walls are unusually high, and which, being situated at the south-east angle, connects the line of batteries on the sea-front with a high wall that defends the town on the land side, and this is strengthened by six bastions. The town has two gates; one towards the sea, the other opening to the south-east on the plain. The houses are built of irregular stones and mud formed into a mass, and whitewashed. They seldom have an upper story, and an aperture is rarely seen in the exterior walls, the rooms being entered and lighted from a spacious square yard in the centre of the building. Tripoli contains six large mosques and a number of smaller mosques. The Jews have their synagogues; and the Christians enjoy the free exercise of their religion. The bazars are extensive. The shops (principally in the hands of the Jews) are miserable-looking hovels, though some of them contain articles of value, such as diamonds, pearls, gold ornaments, rich gems, and scarce drugs. The baths make a considerable show

by their picturesque clusters of cupolas; some of them are chiefly of marble, and are crowded with bathers. A kind of Italian is generally spoken by the people of the town, in which language Europeans may make themselves understood in transacting their affairs. The population is supposed to be about 20,000. Outside of the town are the burying-places; the tombs are decent and numerous.

The harbour is formed by a long reef of rocks running out from the northern point of the town into the sea in a north-easterly direction, and by other reefs at some distance to the eastward of those, which together form a tolerably good shelter. The trade is carried on in small vessels, seldom larger than brigs, none of which are now owned in the country. It has no direct trade with England, but an indirect one through Malta. Marseille, Leghorn, and the commercial towns of the Adriatic and the Levant, likewise trade with Tripoli. The trade of Tripoli must greatly depend upon the communication with the interior; and it profits once or twice a year from the passage of the pilgrims from Western Barbary on their way to Mecca. Formerly these caravans, composed partly of penitents and partly of traders, started from Fez, and passing through Tlemsen, Algiers, and Tunis, increasing as they went, on arriving under the walls of Tripoli, amounted sometimes to 3000 persons, and half as many camels and horses, with their goods and merchandise, returning by the same route. But the pilgrims now take a different route; and the caravans which stop at Tripoli in the present day seldom amount to more than a few hundred persons and animals. The cafilas or small caravans from Fezzan and Ghadamis, are now the principal medium of inland trade. These people exchange their merchandise for that of Europe, and pay the balance in gold-dust.

TRIPOLI occurs massive, with a coarse, dull, earthy fracture; it is meagre and rough to the touch, and yields readily to the nail. Colour, various shades of gray, yellow, and red. It imbibes water, which softens it; when burned it becomes white and is hardened; it is very difficult of fusion.

It was first brought from Tripoli in Africa, but has since been found in France, Italy, and Germany. It is employed in polishing metals, marble, glass, &c. It consists of silica, 90; alumina, 7; oxide of iron, 3.

TRIPOLITZA. [ARCADIA.]

TRISECTION OF THE ANGLE. The difficulty of cutting an angle into three equal parts is entirely of a geometrical nature. Euclid, who confines himself to the description of right lines and circles, could not by these only trisect an angle; but a very slight increase of descriptive power granted to pure geometry would overcome the difficulty entirely. In modern analysis there is no more trouble in trisecting an angle than in finding a cube root. The interest attached to the problem arises in great measure from the number of attempts which have been made upon it, and which have all been unsuccessful in the ancient geometrical sense.

TRISE'TUM, a genus of plants belonging to the natural order of *Grasses*. *T. flavescens*, Golden Oat or Yellow Oat-Grass, is common in Great Britain, especially in rich pastures. This grass does not thrive when cultivated alone. Sheep are very fond of it. *T. pubescens*, Downy Oat-Grass, is a native of Britain. For cultivation it is only a second-rate grass: its produce however is good, and it impoverishes the soil but little. By cultivation it loses the downy character of the leaves, which is generally more evident the poorer the soil on which it grows. It grows naturally on poor, dry, chalky soils. The other species of this genus are not cultivated.

TRISMEGISTUS, or the 'Thrice-Great,' was an epithet given to the Egyptian Hermes, who was said to have invented the art of writing, and to have first taught the sciences of astronomy, astrology, &c.

TRISSI'NO, GIOVANNI GIORGIO, was born at Vicenza, in 1478. He studied the Greek language under Chalcondylas, and became also an elegant Latin and Italian writer. At a mature age he proceeded to Rome, where Leo X. employed him in several diplomatic missions. He was afterwards employed by Clement VII., who sent him on a mission to Charles V. Trissino died at Rome in 1550. He wrote 'Sofonisba,' the first Italian regular tragedy; and 'L'Italia liberata dai Goti,' an epic poem in blank verse, both of them dull and weak. 'La Poetica,' a treatise on the poetical art, is considered Trissino's best work. He also wrote a comedy, entitled 'I Simillimi,' in imitation of the 'Menæchmi' of Plautus; besides some minor compositions.

TRISTAN DA CUNHA, a Portuguese naval commander. In 1505 he commanded a fleet of fifteen vessels, of which Alfonso d'Albuquerque's squadron of five, intended to cruise in the Red Sea, formed a part. Da Cunha sailed, in 1506, with his armament from Lisbon, and steered his course southwards till he reached a latitude so high that some of his men perished from the excessive cold. In lat. 37° 16′ S. he discovered the islands which bear his name. Having wintered at Mozambique, he undertook an expedition in the spring against Melinda, and chastised the people of Brava for withholding the tribute they had promised to pay to Portugal. The fleet then proceeded to the island of Socotra, of which it took possession. Da Cunha and Albuquerque separated. Da Cunha proceeded to Cochin, where he concerted with Almeida an expedition against Calicut. He returned to Portugal with five ships richly laden. Soon after his arrival he was made a member of the council of state, and was sent ambassador to Leo X. in 1515.

In 1536 his son Nuno died at sea on his return from India, where he had been superseded in the chief command by Noronha. Tristan expressed in the presence of the king his keen sense of the indignities offered to his son. This is the last we hear of him: he appears to have died soon afterwards. An account of Tristan da Cunha's expedition was compiled from his MSS. by De Barros, and published by order of the king.

TRISTAN DA CUNHA, a group of Islands

in the Southern Atlantic, S.S.E. of St. Helena, and E.S.E. of the Cape of Good Hope. The largest and central island is intersected by the parallel 37° 6′ N., and by the meridian 12° 2′ W. The islands are three in number; the largest, to which the name of Tristan da Cunha properly belongs, is between 19 and 20 miles in circumference; of the two smaller, that which is named Nightingale Island is to the south of the principal island, and that named Inaccessible Island to the south-west. Water is good and abundant in the large island, and vessels which touch there can easily procure supplies of fresh provisions. These islands were discovered in 1506, by the fleet under Tristan da Cunha.

TRI'TICUM, the genus of plants yielding the various kinds of wheat. It derives its name, according to Varro, from *tritum*, ground or rubbed, because the fruit in its preparation as a food for man undergoes the process of grinding or trituration. The various kinds of wheat have been known from a very early period, and mention is made of wheat as a food in the earliest records of the history of man. Both the Egyptians and Jews made use of wheat as an article of diet, and this food is early mentioned in the Bible. On account of the early cultivation of many of the kinds of wheat as articles of diet, it is impossible to tell where the most common species are really indigenous. All the species of Triticum are however found most abundantly in temperate climates, and there take the place of the foods used in the hotter parts of the world. Wheat is in northern climates what rice and maize are in warmer ones. The part of the plant of Triticum which yields so large a proportion of the food of man is the fruit, seeds, or grain. This fruit, although small in itself, generally forms a large proportion of the plant. When the fruit is ground, the testa, or seed-coat, is separated from what is called the flour. This flour consists of the powdered albumen and embryo of the seed. The proximate vegetable principles which this flour contains are starch and gluten. The starch is a highly carbonised vegetable principle, whilst the gluten is characterised by possessing nitrogen. Foods that contain carbonaceous matters are fattening, whilst those that contain nitrogen are strengthening. It is thus that wheat flour has come to be the staple article of diet of the human race in most countries of the world.

T. vulgare, Common Wheat, includes the *T. æstivum* and *T. hybernum* of botanists. They appear however to be only varieties of this species, differing in their periods of growth. The native country of this species is not well ascertained: it has been found wild in some districts of Persia, also of Siberia, apparently removed from the influence of cultivation. The variety called *T. æstivum* is the type of all the wheats which are called Summer and Spring Wheats. The *T. hybernum* is the Lammas or Winter Wheat, and embraces by far the greater number of varieties which are cultivated as the food of man. *T. turgidum*, Turgid, Cone, or English Wheat, has about ten varieties, half of which are summer and half winter wheats. *T. durum*, Beard Wheat, is a native of Switzerland. It has several varieties, all of which produce summer wheats, and are better known in Italy, Sicily, and Spain, than in this country. *T. polonicum*, Polish Wheat, is found native in some parts of Europe, not however in the country which gives it its name. In cultivation it yields summer wheats, which are adapted for warmer climates than Great Britain. *L. spelta*, Spelt Wheat, is much cultivated in Germany. *T. dicoccum*, Two-Grained or Rice-Wheat, is the *T. amyleum* of some authors, and is cultivated with the other spelts in Germany. *T. monococcum*, One-Grained Wheat, is frequently cultivated in Switzerland, and is used especially for making gruel. *T. junceum*, Sea Rushy Wheat-Grass, is a frequent plant on our sandy sea-shores, and with the *Carex arenaria*, *Elimus arenarius*, and *Festuca rubra*, is one of the plants that binds the sands. Under the influence of the stems and roots of these plants whole districts are rendered cultivable which would otherwise be a mass of barren moving sands. *T. caninum*, Bearded Wheat-Grass, is a common plant in England. Its produce of nutritive matter is considerable. It yields a very early crop when cultivated, and is recommended to be grown on soils of an inferior quality, instead of rye-grass. *T. cristatum*, Crested Wheat-Grass, is a native of Britain, and yields much nutritive matter. On this account it is recommended as a good early grass for heath soils.

TRIUMPH (*Triumphus*) is in general a solemn procession for the purpose of celebrating a victory. Such processions and solemnities have been customary in all warlike nations, but they have never formed so prominent a feature in the history of a people as among the Romans. In a Roman triumph, the general who had gained a victory of sufficient importance to entitle him to this honour, entered the city of Rome in a chariot drawn by four horses; he was preceded by the captives and spoils, and followed by his army. The whole train passed along the Via Sacra up to the Capitol, where the general sacrificed a bull to Jupiter. Such a triumph was the highest honour that a military commander could look for; it was granted by the senate after any victory, provided it was thought sufficiently important to deserve it.

During the empire, the emperor himself, being the chief general of all the armies, was the only person that could claim a triumph, and it was rarely if ever granted to any one else but a member of the imperial family. Other generals received other compensations. All the triumphs that had been celebrated at Rome were carefully recorded in the Fasti Triumphales, and their total number, from the earliest times down to the last, that of Belisarius over the Vandals, has been calculated to amount to 350.

A lesser kind of triumph was called *Ovatio*, perhaps from 'ovis,' a sheep, which the general offered to Jupiter, instead of a bull. It was granted after victories which were not of sufficient importance to deserve the solemn triumph. The principal difference between the two was that in an ovation the general entered the city on foot, and in later times on horseback; he wore

only the toga prætexta, and his brow was adorned with a wreath of myrtle. He carried no sceptre, and was frequently not accompanied by his army.

TRIU'MVIRI, or TRE'SVIRI, that is, 'three men.' A great number of offices at Rome, both ordinary and extraordinary (commissions), were held by three persons in conjunction, who thus formed a board which was intrusted with the management or administration of certain things. The office itself was called triumvirate (triumviratus). Extraordinary triumviri were appointed on various occasions and emergencies; for example, when a new colony was to be founded, the whole management of the business, together with the distribution of lands among the colonists, was usually intrusted to triumviri, whose full title was 'triumviri coloniæ deducendæ,' or 'agro dividundo.'

The triumvirate which has acquired the greatest celebrity in the history of Rome is that which was established towards the end of the republic by Octavianus, Antonius, and Lepidus, B.C. 43. Their power and its duration were sanctioned by a senatus consultum.

The triumviri who were regular magistrates belonged to the minor magistrates. Among them we shall mention:—1. The Triumviri Capitales, who were instituted about the year B.C. 292, and were in many respects the successors of the quæstores parricidii. They inquired into capital offences, apprehended criminals and committed them to prison, wherever they discovered them, and also carried into effect the sentence passed upon them. 2. The Triumviri Monetales, or the inspectors of the mint. 3. The Triumviri Nocturni, whose duty it was to superintend the watchmen in the city at night, and to prevent or put out fires in the city.

TRIXA'GO, a genus of plants belonging to the natural order *Scrophularineæ*. *T. viscosa*, the only British species, is found in damp places in the west of Scotland and south of Ireland.

TROAD. [TROY.]

TROCHAIC VERSE, a kind of verse used by the Greek and Latin poets, especially by the tragedians and comedians. The foot from which it takes its name and of which it principally consists is the trochee (— ⏑), which is combined, like the iambus and anapæst, into *metres* of two feet each. The most common form of the Trochaic verse is that which is composed of three perfect dimeters followed by a dimeter wanting the last half-foot. This form of verse is the 'Trochaic Tetrameter Catalectic' of the Greeks, which was also called by the Romans *quadratus*, from its containing four metres, and *septenarius*, from its containing seven complete feet.

TROCHELLA, Mr. Swainson's name for a subgenus of *Calyptræa*, Lam., placed by him under the family *Haliotidæ*.

Subgeneric Character.—Shell, conical, patelliform; spire central, of two or more whorls; umbilicus closed.

Examples, *Trochella auriculata*, Sow., and *Trochella pileus*, Sow.

Professor Owen has contributed a most interesting addition to our knowledge of this group, in his paper read before the Zoological Society of London, on the 8th of November, 1842, on the anatomy of *Lithedaphus longirostris*.

TRO'CHIDÆ, the name of a family of testaceous turbinated gastropods.

The genus *Trochus* of Linnæus was placed by him between *Murex* and *Turbo*, in his last edition of the 'Systema Naturæ,' and comprised twenty-six species.

The *Trochoidea* of Cuvier form the first family of his pectinibranchiate gastropods [PECTINIBRANCHIATA], and are defined by him as distinguishable by their shell, whose aperture is entire, without notch or canal for a mantle-siphon, the animals being destitute of one; and by an operculum or some organ in lieu of it. They are, Cuvier observes, the *Paracephalophora Dioica Asiphonobranchiata* of M. de Blainville.

The following genera and subgenera are arranged by Cuvier under his *Trochoides*:—

Les Toupies (*Trochus*, Linn.), subdivision *a*, no umbilicus; *b*, umbilicated. Les Cadrans (*Solarium*, Montf.). Les Euomphales (*Euomphalus*), Sowerby.

These are fossil shells resembling the *Solaria*, but without any notches on the internal whorls of the umbilicus.

Next in order follows the genus *Turbo*, Linn., with its subgenera, and then come the genera *Paludina*, *Littorina*, *Monodonta*, or rather *Monodon*, *Phasianella*, *Ampullaria* with its subgenera, *Melania* with its subgenera, *Acteon* (*Tornatella*, Lam.), *Pyramidella*, *Janthina*, and *Nerita* with its subgenera.

The *Trochoides* are immediately followed by the *Capuloides* (*Capulus*, *Hipponyx*, *Crepidula*, &c.). ('Règne Animal.')

De Blainville, Rang, Swainson, and Mr. J. E. Gray, have published their views relative to the arrangement of the *Trochidæ*. As examples of this form we may notice *Trochus obeliscus*, *Trochus imperialis*, *Solarium perspectivum*, and *Solarium variegatum*. The recent species of *Trochus* recorded by M. Deshayes amount to 103, a number under the mark; of *Solarium* he enumerates 12.

Fossil Trochidæ and *Solaria* are very numerous. They occur not only in the newer formations, such as the crag, calcaire grossier, greensand, London clay, &c., but also below the chalk in the greensand of the Isle of Wight, the Oxford oolite in Dorsetshire, and even in the Silurian rocks, viz., the old red sandstone, the upper Ludlow rock, the Caradoc sandstone, the Wenlock limestone, &c.

TROCHI'LIDÆ, the scientific name for the family of *Humming-Birds*.

Linnæus, in his last edition of the 'Systema Naturæ,' placed the genus *Trochilus* at the end of his order *Picæ*, and next to the genus *Certhia*.

Cuvier includes the *Colibris* (*Trochilus*, Linn.) in his order *Passereaux*, placing the group between the *Grimpereaux*, or *Creepers* (*Certhia*, Linn.), which in Cuvier's arrangement comprises the Sun-Birds and the Hoopoes (*Upupa*, Linn.).

The views of Mr. Vigors with regard to this family will be found in 'Linn. Trans.,' vol. xiv.

M. Lesson, in his 'Manuel,' places the *Trochilidæ* next to the *Philledonidæ*, and at the end

of the *Tenuirostres*, making the family consist of two genera only, *Colibri* and *Ornismya*. The same zoologist, in his elegantly-illustrated work 'Les Trochilidées, ou les Colibris et les Oiseaux Mouches,' gives an artificial classification of this brilliant group, termed by him *Trochilus Auctorum*.

Zoological Characters.—Bill longer than the head, straight or arched, the upper mandible a little widened at the base, rounded above and beyond the nostrils, tapering into a point. Lower mandible straight or slightly bent above and below, entering within the upper mandible, dilating a little towards the point, and of the same length as the upper mandible.

Nostrils basal, very small, covered by the advanced feathers of the forehead, placed in a lateral fosset, separated from each other by a slight ridge.

Wings with the quill feathers graduated. The first the longest, and so on in succession.

Tail composed of ten feathers, very variable in length and form.

Tarsi delicate, slender, naked or feathered to the heels, scutellated, having in front three equal toes, the two internal ones a little connected at their base, the hind toe rather stout, all furnished with compressed, curved, and hooked claws, which are rather robust for the toes.

Tongue extensible, long, divided at the summit into two widened filaments, which are slightly spatulate, and supported by two very long branches of the os hyoides acting like a spring, tubular in the centre, or formed of two co-adapted cartilaginous canals.

Geographical Distribution.—America (including many of the adjoining islands), principally between the tropics; but, at the same time, there are species which range very far to the south, and others to the north.

Food.—Soft insects, such as spiders, tipulæ, gnats, ants, and also small coleopterous insects; accessorily the honied juice of flowers.

Plumage.—That of the male brilliant, sumptuous, and with metallic reflections. The livery of the females is nearly always sombre, tarnished, or with but little brilliancy. The young resemble the females, and only gradually gain the dress of the males. The feathers have their barbules constantly disposed in facets, even in those whose plumage is dull.

Habits, more or less migratorial.

This group, *Trochilus*, Lesson divides into 27 races or tribes, some of which are again subdivided into minor sections. Within the last few years numerous species unknown to Lesson have been discovered, and new light has thereby been thrown upon the whole family, rendering the rearrangement of its component parts absolutely necessary. Mr. Gould has undertaken this arduous task, and is preparing a work on the *Trochilidæ*, with resplendent figures of every species.

If we look at the skeleton of a humming-bird (remembering that great and small are relative terms) we shall be struck with the provision made in the sternum and parts connected with it, for the vast development of the muscles of flight. The sternum is deep and wide, and the pectoral muscles form nearly the whole, by weight or measurement, of the fleshy substance of the bird.

Skeleton of Humming-Bird.

The tongue is the principal organ on which these brilliant creatures depend for the power of obtaining their food—nectar, and the insects which lurk in the nectaries of flowers. The tongue is so framed that it can be darted out of the bill by a sudden action of the os hyoides, comparable to that of a spring suddenly released from the detent. It is very long, and can be protruded a good way from the bill. M. Lesson describes it as composed of two musculo-fibrous cylinders attached to each other throughout a great portion of their continuity, and separated towards the point; so that the two tubes, slightly enlarged towards this part, separate from each other, and each presents a little blade, which is concave within and convex externally. The two small blades, or elongated spoon-like terminations, seize the insects or lick up the honied exudations, which are on the instant carried to the aperture of the œsophagus, and forthwith swallowed. The long and slender bill comes in admirably to aid the insertion of the tongue into the nectaries of flowers.

The mode of flight of the Humming-Birds is peculiar. In many species the flight resembles that of the sphinx-moth, and this peculiarity struck Mr. Darwin ('Journal'). Mr. Bullock speaks of them when caged, as remaining as it were suspended in the air, in a space barely sufficient for them to move their wings, and observes that the humming noise proceeds entirely from the surprising velocity with which they perform that motion by which they will keep their bodies in the air apparently motionless for hours together. Wilson says that when they are thus poised or suspended, their wings become invisible, or only like a mist. No one has described their flight more elegantly and accurately than Buffon:—'The vibration of the wings is so rapid that the bird poised in the air appears not only immoveable, but entirely without action. It is seen to stop thus for some instants before a flower and dart off like a gleam to another: it visits them all, plunging its little tongue into their bosom, caressing them with its wings, without ever settling, but at the same time never quitting them.'

The ordinary French term for these birds is *Colibri*, according to Buffon a Carib word. The generic title of Linnæus is infelicitous, viz. *Trochilus* (Τροχίλος) the name given by Aristotle to two distinct birds, as it would appear—one pro-

bably a Wren, the other one of the *Charadriadæ*, or Sand-Pipers, of Egypt.

The voice of the Humming-Birds is in general nothing more than a sharp monotone, frequently repeated under the influence of excitement. At other times they are silent for hours. It is not improbable that some species may sing; but on this point the evidence of travellers is conflicting.

The nests of these birds are as wonderful as any that are made. They vary greatly in form and structure; but in all the soft and delicate materials are so put together as to furnish as much warmth as possible, an object of importance where the body of the parent is generally so small.

Cotton, thistle-down, delicate fibres, a fungus-like substance, and other soft materials woven into a compact and fleecy texture, enter into the composition of the nests of Humming-birds. The outside is in most instances covered with lichens, generally supposed to be stuck on with a sort of glue secreted by the bird; but we have reason to believe that this is not so. The nest, generally, appears to be made by warping spiders' webs over fragments of plants, their down, lichens, &c.; and the lichens, which are never turned the wrong way, are secured by the webs only. The Humming-Birds generally lay two white eggs of an elongated form, which in some species are extraordinarily small. Sir William Jardine states that the Doctor Humming-Bird, as it is provincially termed (*Trochilus hirsutus*), builds its nest suspended, with the entrance somewhat downwards, and lays only one egg. This nest is described as being of a lengthened form, composed of dried grass, slender roots, moss, &c., and as suspended from the leaf of some reed-like plant, to which it is cemented chiefly by the threads of spiders or caterpillars.

The parent birds are bold, and even fierce, in the defence of their young. For some interesting details respecting the process of nidification by these birds, see Sir W. Jardine in the 'Naturalist's Library' ('Humming Birds'); and Captain Lyon in 'Zool. Journ.,' vol. v., p. 1.

Mr. Bullock states that the Humming-Birds in sleeping frequently suspend themselves by the feet with their head downwards, in the manner of some parrots.

It is not only in the hot and low valleys that the humming-birds abound; they frequent also the cold and elevated regions; and Mr. Darwin found two species common upon the Cordilleras, at an elevation of 10,000 feet. The Ruby-Throated Humming-Bird winters to the southward of the United States, and ranges in summer to the 57th parallel, and perhaps even still farther north.

The following are some of the most characteristic examples of the multitudinous forms presented by this gorgeous race.

1. The Cora Humming-Bird (*Ornismya Cora*). Locality, Peru. Gorget, iridescent.

2. The Double-Crested Humming-Bird (*Ornismya chrysolopha*). Crest, golden, changing into ruby and emerald. Pointed gorget, dark changeable violet.

3. The Sickle-Winged Humming-Bird (*Trochilus falcatus*). Exterior quills falcated, with dilated shafts. Gorget, shining blue.

4. Recurved-Bill Humming-Bird (*Trochilus recurvirostris*). Gorget, brilliant emerald-green. Locality, Peru.

5. Gould's Humming-Bird (*Ornismya Gouldii*). Gorget, lustrous emerald-green. A fan of white feathers, ocellated each at the tip with sparkling gold and emerald, encircled by deep green, adorns each side of the neck.

Gould's Humming-Bird.

6. The Bar-Tailed Humming-Bird (*Ornismya Sappho*), a bird of very gorgeous plumage, with a long forked-tail of graduated feathers, resplendent with changeable gold or copper, passing into velvet-black at the tips. Locality, Peru.

May we venture, in conclusion, to hint at the possibility of importing these lovely birds, and keeping them in an easy captivity? Father Montdidier, according to Labat, kept humming-birds alive for five or six months, and they brought up their young in his apartment. Don Pedro de Mango caught a Humming-Bird sitting on her eggs; he cut off the twig, and brought it with the nest on board. The bird became so tame as to suffer herself to be fed on honey and water during the passage, and hatched two young ones. The mother did not long survive, but the young were brought to England, and continued some time in the possession of Lady Hammond, from whose lips they took honey; and though one did not live long, the other survived for at least two months from the time of their arrival.

TROCHOIDAL CURVES. Under this term is included a large number of lines which are produced by the composition of two circular motions, including the straight line, the circle, the ellipse, a class of curves called epitrochoids, of which one particular case is called the epicycloid, and a class called hypotrochoids, of which one particular case is the hypocloid. Among these must also be included the extreme case in which one of the motions is rectilinear, which gives the common trochoid, the cycloid, and a class of spirals which includes the involute of the circle, the spiral of Archimedes, and others.

TROEZEN. [ARGOLIS.]

TROGLO'DYTÆ. Under this term the ancients appear to have comprised more than one race of men. The principal race, that referred to by

Pliny ('Nat. Hist.,' v. 8) as excavating caves for habitations, feeding on serpents, and expressing their ideas by inarticulate sounds, is placed among the Æthiopians. A description of the mode of living of the Troglodytæ on the Arabian Gulf (the Red Sea) is given by Strabo (xvi., p. 775, &c., ed. Casaub.).

TROGO'NIDÆ, a family of *Insessores*, or Perching Birds, remarkable for the beauty of their plumage, and the zygodactyle structure of the feet. The tarsi are short and feeble; the gape is wide; the beak stout; the head large; the general contour of the body full and rounded; the plumage dense, soft, and deep; the wings short, but pointed; the tail long, ample, and graduated; the tail-coverts elongated and pendent. Locality, South America, India and its islands; also Africa.

Mr. Gould's splendid 'Monograph of the Trogonidæ' was finished in 1838; and in the 'Introduction' to that work he observes, that these birds, as their general structure and their habits sufficiently indicate, belong to the fissirostral tribe of the *Insessores*. 'Greatly insectivorous,' says Mr. Gould, 'they seize the flitting insect on the wing, which their wide gape enables them to do with facility; while their feeble tarsi and feet are such as to qualify them merely for resting on the branches, as a post of observation whence to mark their prey as it passes, and to which, having given chase, to return. As in all other groups however, we shall find modifications of the type constituting the ground of generic or subgeneric divisions. . . . If not strictly elegant in form, the Trogons in the brilliancy of their plumage are surpassed only by the *Trochilidæ*. Their splendour amply compensates for every other defect. Denizens of the intertropical regions of the Old and New World, they shroud their glories in the deep and gloomy recesses of the forest, avoiding the light of day and the observation of man. Dazzled by the brightness of the meridional sun, morning and evening twilight is the season of their activity.'

Mr. Gould refers to Mr. Griffith's edition of Cuvier's 'Animal Kingdom' for an account of the habits of the Trogons; and the author of that account notices their long attenuated feathers with disarranged and luxuriant barbs as making them appear more bulky than they really are. The feathers, too, are stated to be so feebly implanted that they fall at the slightest agitation, and the skin is described as being so delicate that it will tear upon the slightest tension.

The Trogons themselves are described as solitary birds, extremely jealous of their freedom, never frequenting inhabited or open tracts, and delighting in the silence of deserts. 'The interior of the thickest forests,' says the describer, 'is their chosen abode for the entire year. They are sometimes seen on the summits of trees; but in general they prefer the centre, where they remain a portion of the day without descending to the ground, or even to the lower branches. Here they lie in ambush for the insects which pass within reach, and seize them with address and dexterity. Their flight is lively, short, vertical, and undulating. Though they thus conceal themselves in the thick foliage, it is not through distrust; for when they are in an open space, they may be approached so nearly as to be struck with a stick. They are rarely heard to utter any cries, except during the season of reproduction, and then their voice is strong, sonorous, monotonous, and melancholy. They have many cries, from the sound of one of which their name is derived. All those whose habits are known nestle in the hollows of wormeaten trees, which they enlarge with their bills so as to form a comfortable and roomy residence. The number of eggs is from two to four, and the young are born totally naked, but their feathers begin to start two or three days after their birth. The occupation of the male during incubation consists in watching for the safety of his companion, bringing her food, and amusing her with a song, which, though we should call it insipid, is to her without doubt the expression of sensibility. Some of the Couroucous express the syllable *pio*, repeated many times in succession with a powerful yet plaintive tone. Their accent almost reminds one of the wailings of a child who has lost its way, and it is thus that they cry to each other amidst the silence of the forests. As soon as the young are able to provide for themselves, they separate from their parents to enjoy that solitude and isolation which appear to constitute the supreme happiness of the species. Their aliments are composed of larvæ, small worms, caterpillars, coleoptera, and berries, which they swallow entire. The male, at various ages, the female, and the young, differ in their plumage, which has given rise to the institution of more species than are really in existence.'

With regard to the *Geographical Distribution* of the Trogons, Mr. Gould says that they appear, on general survey, to be divided between America, including its islands, and the islands of the Indian Archipelago; two or three species only having yet been discovered on the continent of India, and those principally inhabiting the countries bordering the Indian Seas. The great nurseries for these birds in the Old World are, he observes, the islands of Ceylon, Sumatra, Java, Borneo, &c.; while over the whole continent of Africa only a single species has yet been discovered. 'It is in South America however,' continues Mr. Gould, 'that we find the greatest number of species, and those of the most exquisite plumage: nor is this all; for it will be further observed that, in accordance with the great geographical distribution thus pointed out, there exist certain characters common to the species inhabiting each region, which, although not very apparent to the unpractised eye, constitute the basis of generic subdivisions, and doubtless have an influence upon their habits and manners. Between the American species and those inhabiting India and Africa, we not only find this broad line of distinction, but discover moreover that the birds of each country are themselves naturally resolvable into certain minor groups, each possessing its peculiar characters, and each as different in habits as in form.'

Mr. Gould further remarks that the beautiful species of the group to which the subgeneric title

of *Calurus* has been applied, distinguished by a redundancy of flowing plumage, are not, as may be expected, so well fitted for flight, or for taking their prey on the wing, as are the more closely-plumed species to which the generic name *Trogon* is now restricted. Accordingly Mr. Natterer informed Mr. Gould that the gorgeous birds of the former group tenant the topmost branches of the loftiest forest-trees, clinging beneath them like parrots, and feeding more exclusively on fruits and berries; while, on the other hand, Mr. Gould notices Mr. W. S. MacLeay's statement, that the singular Trogon inhabiting Cuba (the only example of the subgenus *Temnurus*), which approximates to the woodpeckers in the more lengthened form of the bill, in the rigid character of the outer tail-feathers, and in the spotting of the wings, approaches those birds also in its habits, giving a preference to the holes of trees rather than to the branches, from the bark of which it procures the larvæ and various insects which constitute its food.

The habits of the Old World species are much less known than those of the American Trogons; but from the more robust form of their bill and their wide gape, Mr. Gould is inclined to suspect that they feed even still more exclusively on insects than on fruits. Independently however of the greater strength of the bill, the non-serration of the edges of the mandibles, and the half-denuded face, they may, Mr. Gould remarks, at all times be distinguished by the rich brown colouring of the backs of the males, and by the entire absence of bars across the outer tail-feathers. With respect to the brown colouring of the plumage, there are, he adds, it is true, one or two exceptions to the rule, but none to the absence of the barring of the tail-feathers when accompanied by the former character.

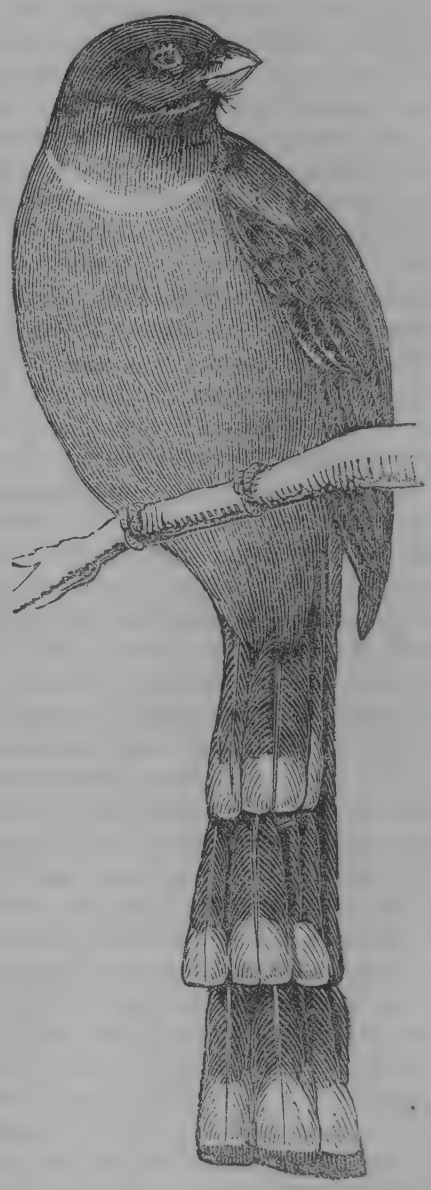
The subgenera into which the Trogons are subdivided by Mr. Swainson appear to Mr. Gould perfectly natural; and he adds a synoptical table with the species arranged under those subgenera, retaining however the generic name of *Trogon*, universally applied to the whole family in the body of his work.

In one sense the Trogons form an isolated group. Mr. Swainson considers them most nearly allied to the *Caprimulgidæ*. ('Classification of Birds'.)

American Trogons.

The remarkable plumage and shy habits of the Trogons did not escape the observation of the ancient Mexicans, in whose mythology one of the species at least (*Trogon pavoninus*) was celebrated. Another species, the *Tzinitzcan* of the Mexicans, *Trogon Curucu*, Linn., was employed by them, according to Hernandes (c. xliii.), in the fabrication of the figures and pictures used on festivals, in war, and in their temples. They were probably kept in one of the two houses which formed the Royal Menagerie of ancient Mexico, one of these houses being appropriated to birds which did not live by prey; the other to birds of prey, quadrupeds, and reptiles. Three hundred men, according to Cortes, were employed to take care of these birds, of whom some procured their food, others distributed it, others took care of the eggs at the time of incubation; whilst others, at certain seasons, picked their plumage—for the king not only delighted in the sight of so many species, but was very careful of their feathers for the sake of the mosaic images and pictures as well as of the other works which were made of them.

Examples.—The Mexican Trogon (*Trogon Mexicanus*, Swains.); the Resplendent Trogon



Mexican Trogon (*Trogon Mexicanus*). Male.

(*Trogon* (*Calurus*) *resplendens*, Gould), a bird of incomparable brilliancy, and distinguished by the extreme length of the long loose upper tail-coverts. Colour, gorgeous golden green. Locality, Mexico.

African Species.

Example.—The African Trogon (*Trogon* (*Apaloderma*) *Narina*, Le Vaill.). Locality, South Africa. Inhabits dense woods. By the title *Narina* Le Vaillant celebrates the name of a Gonaqua Hottentot girl, whose charms had made a deep impression upon him.

Asiatic Trogons.

Example.—Reinwardt's Trogon (*Trogon* (*Apaloderma*) *Reinwardtii*, Temm.). Locality, Java and Sumatra, where it was discovered by Professor Reinwardt, whose name it bears.

TROGONO'PHIS. Professor Kaup's name for a genus of Reptiles, placed by MM. Duméril and Bibron among the *Chalcidian Lizards*. Ex-

ample, *Trogonophis Wiegmanni*, Kaup. Locality, Algiers, Bona, Oran, &c.

TROGUS POMPEIUS, a Roman historian who lived about the time of Augustus. He was the author of a Universal History, from the time of Ninus king of Assyria, down to the year 5 B.C., which consisted of 44 books. The original work is now lost, and the only means we have of judging of its merit is an abridgement made by Justínus, which is still extant. [JUSTINUS.]

TROLLIUS, a genus of plants belonging to the natural order *Ranunculaceæ*. The name of this genus is derived from *trollen*, a German word expressive of a rolling or globular motion. The German name of the genus is *Trollblume*; the English is Globe-Flower, and the French *Boule d'Or*. *T. Europæus*, European or Mountain Globe-Flower, is abundant in the whole chain of the Alps, and is also found in mountainous districts in the north of England, Ireland, Wales, and Scotland.

TROMBO'NE, the same instrument as the *Sackbut*, is a deep-toned trumpet, composed of sliding tubes, by means of which every sound in the diatonic and chromatic scales, being within its compass, is obtained in perfect tune. The Trombone is of three kinds,—the *alto*, the *tenor*, and the *base*, and these, in orchestral music, are generally used together, forming a complete harmony in themselves.

The scale of the *Alto-Trombone* is from C, the second space in the base, to G, an octave above the treble clef; that of the *Tenor-Trombone* is from B, the second line in the base, to A, the second space in the Treble; and that of the *Base-Trombone* is from C, an octave below the second space in the base, to G, the second line in the treble.

TROMP, MARTEN HARPERTZOON, the son of a Dutch naval officer, was born at the Briel in 1597. He was present with his father at the engagement between the Dutch and Spanish fleets under the cannon of Gibraltar, April 25, 1607; and his father being not long after killed in an engagement with an English cruiser, and his ship captured, young Tromp was detained two years and a half a prisoner. For some years after this adventure his career was obscure. In 1622 we find him a lieutenant on board a ship of the line; and two years later Prince Maurice gave him the command of a frigate.

In 1637, after several years of inaction, Tromp was made lieutenant-admiral, and received the command of a squadron of eleven ships. With this fleet, in 1637 and 1638, he took so many ships from the Spaniards that the States presented him with a gold chain, and the King of France conferred upon him the order of St. Michel. In April, 1639, Tromp again set sail to cruise against the Spaniards off the coasts of France and England. On Sept. 15, with only twelve ships in company, he had sight of a large Spanish fleet off the coast of Sussex. After making several indecisive attacks, he, on Oct. 13, again came up with it, and by this time both parties were much strengthened. The action commenced on the 21st. The result was, that Van Tromp gained a complete victory, and 13 richly-laden galleons fell into the hands of the Dutch.

Tromp also rendered important services to his country in the wars of 1640 and 1641; and after Cromwell had seized the helm of government in England, he was opposed in the naval war by his great rival Blake. [BLAKE.] Blake's impaired health obliged him to quit the fleet, and Tromp in his last battle was opposed by Monk. The fleets engaged July 29, 1653. Both sides claimed the victory; but the Dutch suffered an irreparable loss by the death of Tromp.

TROMP, CORNELIS VAN, second son of the great admiral, was born at Rotterdam, Sept. 9, 1629. He was educated for the navy; and at the age of 21 commanded a ship in the squadron dispatched, in 1650, against the Emperor of Marocco.

In 1652 and 1653 he served in the Mediterranean, distinguished himself in various engagements, and on March 13, 1653, he was made rear-admiral.

After leading a private life for some time, in 1656, when war with England was entered into, Van Tromp with his squadron was attached to the fleet commanded by Wassenaer Van Opdam. In the first action with the Duke of York, July 13, the Dutch were beaten, but Tromp greatly distinguished himself.

In 1666 he accepted the command of the Hollandia of 82 guns, and was present at the victory which Ruyter gained over the English under Albemarle, June 11, and four successive days. Another engagement took place, Aug. 4, and was renewed on the 5th. Tromp had the advantage over the vice-admiral Smith who was opposed to him; but Ruyter was worsted. Ruyter attributed his defeat to Tromp having acted an independent part, and neglected to support him, and complained of his misconduct. Tromp recriminated, but the States deprived him of his commission, and placed him under provisory arrest at the Hague.

In 1673 his commission was restored to him by the stadtholder, afterwards William III. A reconciliation took place between Tromp and Ruyter. In the engagements of June 7 and 14, with the allied fleets of France and England, Tromp displayed the most reckless courage; but on both occasions he was indebted to Ruyter for bringing him off when he had engaged himself too far.

A descent on the coast of France was projected by the States, in 1674, and Tromp was appointed to carry it into execution; but the result was unsuccessful. In 1675 he visited England, and was created a baron by Charles II. In 1676 he was despatched with a fleet to assist the King of Denmark in his war with Sweden. Van Tromp, on his return to Holland, was appointed lieutenant admiral-general of the United Provinces. He accompanied the Prince of Orange in the expedition against St. Omer. After this he retired from public life till 1691, when he was induced to accept the command of a fleet against France, but died at Amsterdam, May 21 or 29, before its equipments were completed.

TROND, ST. [LIMBURG, *Belgian*.]

TRONDHIEM, more commonly known by the name of *Drontheim*, but in the country itself

pronounced *Tronyem*, is the most northern of the provinces of Norway, extending from 62° N. lat. to 71° 10′ N. lat. It lies between 5° and 31° E. long.

Trondhiem comprehends the countries situated on the northern declivity of the Norrska Fiellen, and those which lie on the western and steeper slope of the Kiölen Mountains: the greater part of it is exceedingly mountainous, and very little fit for agricultural purposes. This circumstance, united to the severity of the climate, must be considered as the cause of its very small population. A few years ago the whole population did not exceed 300,000 individuals, which gives only 5 persons to the square mile. Trondhiem is divided into three sections, Proper Trondhiem, Nordland, and Finmarken.

Trondhiem Proper is indented by numerous inlets, of which Trondhiems Fiord is the most important; this fiord is 60 miles long by 3 to 5 wide. South of the fiord the country lies on the northern declivity of the Lang Field and Dovre Field, which are portions of the Norrska Fiellen. The coast is here very deeply indented by arms of the sea, which form numerous islands and peninsulas. Many of the fiords extend inland 50 miles, and on their banks are the only fertile spots. The interior of the country is occupied by the mountain-region of the Norrska Fiellen, which rises in one point to a height of 7489 feet; it stands upon a table-land, which is furrowed by several steep ravines. The country along the southern shores of Trondhiems Fiord contains a much greater portion of arable land, and is more extensively cultivated and more populous than the northern. It is watered by four rivers, which, from west to east, are called Oerkel, Guul, Nid, and Stor-Elf. The small district of Röraas lies on the Dovre Field, close to the boundary of Sweden, and comprehends the country in which the Glommen-Elf originates. Northward of Trondhiems Fiord, an immense mass of high rocks extends along the sea from the shores of the fiords to the mouth of Namsen-Elf, which is the largest of the rivers of Norway which fall into the North Sea.

Nordland comprehends all the countries lying between the parallel of the island of Leköe and the Quaenanger Fiord. The southern part is called Helgeland, the central district Salten, and the northern portion Tromsöe. The islands of Lofoden and of Senyen are also included in it. Helgeland has numerous islands near the shore; but the fiords are not deep. The interior is filled up by mountains rising from 1000 to 1500 feet, between which occur numerous narrow valleys and depressions, which in general are well wooded, though the trees rarely attain the size of timber-trees. Salten comprehends the country between Cape Kunnen and Ofoden Fiord; it is the most desolate part of Norway; and the coast is marked by exceedingly precipitous promontories. The *Lofoden Islands* lie opposite the coast of Salten, and are divided from it by an arm of the sea called West Fiorden. They constitute a rocky chain, which near the continent runs nearly due W., but farther to the W., declines to the S.W. The islands are separated from one another by narrow straits, through which the sea flows during the tides with a rapidity resembling a torrent. In some parts it forms very deep and extensive eddies, among which the whirlpool called the *Malström*, and which is found between the islands of Moskenäsöe and Mosköe, has obtained celebrity, as it is impossible to navigate it during the strength of the tides, and it has caused much loss of life. The population of this group is stated not to exceed 8000 individuals; but during the fishing season these islands are visited by between 3000 and 4000 boats. The district of Tromsöe is on the mainland, somewhat beyond the parallel of the Lofoden Islands; it is a mountainous region.

Finmarken comprehends the most northern portion of Trondhiem, extending from Quaenanger Fiord to the Tana-Elf and Varanger Fiord. Along its western side, between Quaenanger Fiord and Alten Fiord, extends a mountain range, which terminates near the sea in the isolated Yekuls Field, rising 3700 feet above the sea, the most northern glacier (70° N. lat.). The country east of this range contains a more elevated and a lower region, of which the former lies to the north and the second to the south. The permanent settlements in this region are only found in the recesses of the fiords. The lower region is in general a plain, which in its highest point, near the sources of the Alten-Elf, is about 1200 feet high, and which contains numerous small lakes. Several large islands lie along the coast of Finmarken, west of the Porsanger Fiord. The largest of them, Seyland and Soröe, rise to a great elevation, and are inhabited by a few fishermen. On Qualöe is a commercial place, Hammerfest, which has about 400 inhabitants. The harbour, being safe, is much visited by foreign vessels, especially Russian and English. The most northern island is Margeröe, a bare rock, which towards the north terminates in the North Cape, a huge mass of rocks rising to 1500 feet above the sea.

TRONDHIEM, the capital of the province of the same name, is built on the southern shore of Trondhiems Fiord, at the mouth of the Nid-Elf, which river nearly encircles it. It has regular and wide streets, with water-cisterns at their intersections. The houses are generally of two stories, and built of wood, hardly half a dozen of them being of brick. The cathedral is a gothic building, a part of which was erected as far back as 1033. In the fiord, and at a distance of about a mile, is a small rocky island, Munkholm, on which a fortress is built. The roadstead for shipping is exposed to a heavy swell from the N. and N.W., and has a loose ground in 20 fathoms. The population consists of between 12,000 and 13,000 individuals. The commerce is considerable. The exports consist of fish (dry salmon, ling, cod, and herring), fish-oil, timber, tar, copper brought from Roräas, and mill-stones. The town employs about 60 ships, and 260 small craft, in the fisheries along the northern coast of Norway, and about 50 vessels in conveying wood and timber to France.

TROON. [Ayrshire.]

TROPÆO'LEÆ, a small suborder of plants in

the natural system of Lindley, in the natural order *Balsaminaceæ*. Jussieu makes it a distinct order.

TROPÆ'OLUM, a genus of plants, the type of the suborder *Tropæoleæ*. The species of this genus are all of them inhabitants of South America. De Candolle enumerates 13 species, Don 18, and two others have been lately added to their number. They are all climbing plants.

T. minus, Small Indian Cress or Nasturtium, is a native of Peru. It has deep yellow flowers streaked with orange and red. The whole plant possesses an acrid flavour and odour, which are peculiar to this order and the *Cruciferæ*. It is on this account that all the species of Tropæolum have obtained the common name of *Nasturtium*, which is the name of a genus of plants belonging to *Cruciferæ*. *T. majus*, Great Indian Cress or Nasturtium, is also a native of Peru. The fruit of this, when green, like the preceding species, is made into a pickle. *T. aduncum*, Hooked Indian Cress or Nasturtium, is a native of both Mexico and Peru. It is a very tender plant, requiring greenhouse cultivation in this country. *T. tricolorum*, the Tricolor Indian Cress or Nasturtium, is a native of Chili at Coquimbo. It is the most showy and handsome of the species. The *T. tuberosum*, like this species, has tuberous roots which are eaten when boiled. It is a native of Peru. *T. pentaphyllum*, the Five-Leaved Indian Cress or Nasturtium, is a native of Buenos Ayres, Monte Video, and Brazil in the province of Cisplatine. *T. azureum*, Purple Indian Cress or Nasturtium, was discovered by Mr. Miers, and first described in his 'Travels in Chili,' and had been previously seen by Mr. Bridges on the Carycam de Quillota, 4000 feet above the surface of the sea.

Most of the other species of Tropæolum have obtained a place in our collections, on account of their handsome and variously-coloured flowers. The greenhouse species will thrive in a light rich soil.

TROPHIS, a small genus of plants of the natural family of *Artocarpeæ*. The species are found both in the East and West Indies, though it is supposed by some that these may be generically distinct.

TROPHY (τρόπαιον, *tropæum*) contains the same root as the Greek verb τρέπειν, 'to turn or to put to flight,' and was originally a memorial erected on the spot where an enemy had been conquered or put to flight. It was a practice among the Greeks seldom to erect trophies in any other place than the field of battle. A trophy in Greece after a victory on land appears to have consisted of a trunk of a tree fixed on some eminence and adorned with the spoils and armour of the vanquished. An inscription usually recorded the names of the conqueror and the conquered, and the whole trophy was dedicated to some divinity. The Romans down to the latter period of the republic never erected any trophies on the field of battle: the spoils of a vanquished enemy were partly distributed among the soldiers, partly dedicated in the temples of the gods, and partly applied as ornaments for other public buildings and places. When however the Romans adopted the custom of raising trophies on the field of battle, they usually consisted of more solid structures than the Greek, such as towers, columns, &c.

TROPIC BIRD (*Phaëton*, Linn.), a genus of palmipede birds, generally placed among the *Pelecanidæ*, but by some among the *Laridæ*, or Gulls.

Two species only are known, the Common Tropic Bird (*Phaëton ætherius*), and the Red-Tailed Tropic Bird (*Ph. phœnicurus*). Size, about that of a large pigeon.

This genus, so well known to navigators as the harbinger of the tropics, is distinguished at once by the two long slender tail-feathers, which have obtained for the species, of which two only are recorded, the French name of *Paille-en-Queue*. Their length of wing and comparatively feeble feet proclaim them formed for flight, and they are accordingly swift and untired on the wing, disporting in the air far at sea; and when on land (to which they do not often retreat for any length of time together, excepting at the period of nidification), perching on rocks and trees. They rarely quit the torrid zone and its neighbourhood.

M. Lesson remarks that the two species form a well-defined, artificial, and purely geographical group. Their habitual domicile in the torrid zone does not separate them from the land; and they can reach, as they do nearly every night, the isles and lofty rocks that serve them as a place of refuge. Nevertheless M. Lesson met with them so often in sea-tracts entirely devoid of land, and heard them so often above his head in the calms and fine tropical nights, that he thinks they should be considered as oceanic birds.

The food of these birds consists entirely of fish, which they seize at the surface, swooping down from their altitude with arrow-like velocity. They breed on desolate rocks and lonely islands, numbers as it would appear congregating together. Catesby, who shot many off the Bermudas during the breeding season, says that, from the inaccessible nature of the cliffs they resorted to, he was prevented from seeing their eggs or nests.

TROPICS, the circles of the earth parallel to the equator which pass though those places to which the sun is vertical at the solstices, being the extreme boundaries of the torrid zone. The latitude of any spot upon either tropic is therefore the same as the obliquity of the ecliptic, and the interval between the northern and southern tropics comprehends every part of the earth at which the sun is ever vertical. The northern tropic is called the Tropic of Cancer, and the southern the Tropic of Capricorn, since the sun, when vertical at places in the first, is at the commencement of the astronomical sign of Cancer; and when vertical at places in the second, is at the commencement of Capricornus.

TROPIDOGASTER, the name given by MM. Duméril and Bibron to a genus of Saurians (*Eunotes*) belonging to the Iguanian Lizards. Only one species is known, viz. *Tropidogaster Blainvillii*.

TROPIDO'LEPIS, Cuvier's name for a genus

of Saurians resembling the *Agamæ* in their teeth and form, but uniformly covered with imbricated and carinated scales. Their series of pores is very strongly marked.

Example. — *Tropidolepis undulata* (*Agama undulata*, Daudin), an American species, remarkable for the white cross which it has under the throat on a dark blue ground.

MM. Duméril and Bibron observe that this genus, which, when Cuvier wrote, comprised but a single species, *Agama undulata*, Daud., now comprehends nine others, all natives of Mexico.

TROPIDOSAURA, Boie's name for a genus of *Lacertian Lizards* or *Autosaurs*, belonging to the subfamily of *Cœlodont Autosaurs* (*Leiodactyls*) of Duméril and Bibron (*Algira*, Cuvier; *Psammuros*, Wagl.; *Psammurus*, Wiegm.).

The *Tropidosaura* are remarkable as being nearly the only Lacertians whose lower parts, that is to say, the throat, the neck, the breast, the belly, and the under part of the limbs, are protected by scales absolutely resembling those which clothe the same regions in the greater part of the species of Scincoidians. Granules extremely close-set cover the posterior surface of the thighs, along the under part of which is a series of pores. The subdigital scutellations are smooth, sometimes rather thick; they form a single row, and are disposed like the tiles on a roof. The claws are moderately long, compressed, arched, and pointed. ('Erpétologie.')

Four species are recorded, all inhabitants of the Old World:—*Tropidosaura algira*, Fitz. (Mediterranean coasts of Africa); *Tropidosaura Capensis*, Dum. and Bibr. (Cape of Good Hope); *Tropidosaura montana*, Boie, (Java); and *Tropidosaura Duméritii*, Smith (South Africa).

TROPIDU'RUS, Wiegmann's name for a genus of Saurians, placed by Mr. Swainson under the *Agamidæ*, by Mr. J. E. Gray under the *Iguanidæ*, and by MM. Duméril and Bibron, who have changed the name, unnecessarily as Mr. Swainson thinks, to *Proctotretus*, under the Iguanian Lizards, or Eunote Saurians.

MM. Duméril and Bibron divide their genus *Proctotretus* into two groups.

1st. *The Leiodores.*

Species which have the neck smooth or level.

Example.—*Tropidurus chilensis, nitidus*, et *olivaceus*. Locality, Chile.

2nd. *The Ptygoderes.*

Species with the neck folded on each side: nine in number, and all from Chile.

Example.—*Proctotretus cyanogaster.*

TROPPAU. [Moravia; Silesia, *Austrian.*]

TROUBADOURS, the name given to those poets in the Romance language, or Langue d'Oc, who lived in southern France, eastern Spain, and northern Italy, during the 12th and 13th centuries. [Romance Language.] The name is a French form, from the Provençal 'trobador,' a derivative of the verb 'trobare,' 'to find,' and means an 'inventor.'

It was in the south of France that the poetry of the troubadours originated, and it was in the 12th century that their poetry attained its perfection: that poetry was essentially lyrical and mostly amorous, and was characterised by simplicity, or rather paucity, of ideas, and by a strained refinement of expression and peculiarity of form which made it quite distinct from the classical models.

The troubadours sang at times of loftier themes than love. Some of them, who had followed the Crusades, sang after their return the valiant deeds of the soldiers of the Cross. Others wrote to animate the Christian princes to deliver Palestine. Others, especially about the time of the persecution of the Albigenses, wrote bitter satires against the persecutors, the Inquisitors, against the priesthood, the hierarchy, and against Rome itself. That persecution was one of the causes of the decay of troubadour poetry in the 13th century. [Albigenses.] Many of the troubadours perished, or fled, and died in foreign lands. The counts of Provence made some attempts to revive the poetry of the troubadours, but the only result was the collecting and compiling the lives of the old troubadours by the monks of the isles of Hyères, and Hugues de St. Césaire.

At Toulouse the 'Capitouls,' or municipal magistrates, established an academy called 'Del Gai Saber,' or 'of the gay science;' and seven of the best rhymers of the place, styled 'the Seven Troubadours of Toulouse,' were placed at the head of it. They fixed upon the 1st of May for holding an annual public festival, to which they gave the name of 'Floral Games.' The first meeting was held in 1324, and was attended by many poets from various parts of Languedoc. [Clemence Isaure.] The morality of troubadour poetry underwent a reform under this new institution. The pageant of the 'Floral Games' continued to be held till the great French revolution.

Several French writers have published accounts of troubadour poetry and its authors, but the last and best is Raynouard, in his 'Choix des Poésies Originales des Troubadours,' 6 vols. 8vo., Paris, 1816-21, and 'Lexique Romain, avec un nouveau Choix des Poésies Originales des Troubadours,' Paris, 1836.

The singular institution of the Courts of Love is closely connected with troubadour history. These Courts were wont to assemble in various towns and castles of France; they consisted chiefly of ladies, to whom some knights acted occasionally as assessors.

The Code of Love is given by Maître Andre, in a Latin work, entitled 'De Arte Amatoria et Reprobatione Amoris,' written about 1170. The code consists of 31 articles, some of which are of a very libertine tendency.

TROUGHTON, EDWARD, was born Oct., 1753. He was placed in the firm of his uncle and brother, who carried on business in London as mathematical instrument makers. He became the head of this business, and died June 12, 1835. The great works of Troughton are as well known in the astronomical world as those of Wren in the architectural; but he also applied himself with great success to all the minor branches of his business. He wrote one or two articles in the 'Philosophical Transactions,' and several in Brewster's 'Cyclopædia,' &c.

TROUS DE LOUP, in the military art, are

pits dug in the ground in the form of inverted cones or pyramids, in order to serve as obstacles to the advance of an enemy: each is made about 6 feet in diameter, or in breadth, and as many in depth, and a pointed stake is planted upright in the bottom. The pits should be disposed checquer-wise in two or three rows, their centres being at distances of about 10 feet from one another. They are generally formed before the salient points of field-works or in the intervals between them; and they are sometimes executed in rear of such works in order to protect the gorges when these are without parapets.

TROUT, the common name of various species of fishes belonging to the genus *Salmo*. In the article SALMONIDÆ the characters of the genus *Salmo* and the habits of the *Salmo salar*, Common Salmon, are described: we shall confine our remarks here to the species of *Salmo* known by the name of Trout.

The Bull-Trout (*S. eriox*) is a thicker fish in proportion to its weight than the salmon: the fins and tail are much more muscular; the head is also larger in proportion to its body, and the teeth are longer and stronger. This fish is found abundantly in the Tweed and its tributaries, and also in some of the rivers of the Solway Frith, as well as occasionally in Dorsetshire and Cornwall. The young fish, when they weigh not more than two or three pounds, are called Whitlings. As food their flesh is less esteemed than many others of the salmon tribe, as it is coarse (which is quite in accordance with their strong muscular development), and is of a pale orange or yellow colour. In the markets they obtain only an inferior price. The fish known by the name of the Norway Salmon seems to be identical with this species. They take the bait freely, and when hooked, owing to their powerful muscular structure, make prodigious efforts to escape. It is migratory, and attains a weight of about 25 pounds.

The Salmon-Trout (*S. trutta*). This, with the preceding species and the *S. salar*, are the only migratory species of salmon which inhabit the waters of Great Britain. Next to the salmon itself, the salmon-trout is most esteemed as an article of diet. It has a small head, a very broad back, a slightly forked tail; the flesh is a pink colour, and of a rich flavour. This fish is the White Trout of Devonshire, Wales, and Ireland; the Sea-Trout, Herling, and Whitling of the Solway; the Finnock of the north and west coasts of Scotland; and the Salmon-Trout of the London market. In their migratory habits and the time and mode of depositing their spawn, they resemble very much the Common Salmon. The Fordwich Trout of Isaac Walton is the Salmon-Trout. The best in the London markets are those from Perth, Dundee, Montrose, and Aberdeen. The largest specimen ever seen by Mr. Yarrell weighed 17 pounds.

The Common Trout (*S. fario*) is an inhabitant of most of the lakes and rivers of Britain, and is perhaps, on account of its colours and form, the most lovely and beautiful creature of its class. The variations of its tints are almost infinite; yellow however is the predominating ground-colour, varying to an orange, and sometimes passing into a dark greenish black or violet, which is covered over with black and red spots. These great variations in its colour seem to depend on the qualities of its food. Those feeding on fresh-water shrimps have the most brilliant colour, and have the finest flesh; whilst those which are obliged to live chiefly on aquatic vegetables have a much less brilliant colour and less delicate flesh. The average weight of the trout is about a pound or a pound and a half; in ponds and stews they sometimes reach a larger size, and specimens have been seen weighing as much as 15 pounds. Some of the deep pools in the Thames above Oxford yield the finest trout. The Gillaroo Trout of Ireland seems to be only a variety of the common trout. Several of the loughs of Ireland produce this fish.

The Great Gray or Lake Trout (*S. ferox*) was first noticed by Pennant as an inhabitant of Ulswater Lake in Cumberland, and Loch Neagh in Ireland. This fish attains an average weight of 25 pounds, but specimens have been seen weighing 50 or 60. It may be distinguished from the last species by its great size, the large proportional size of the head, and the square extremity of the tail in all its stages of growth. This fish is almost entirely confined to lakes, seldom ascending or descending rivers, and it never migrates to the sea. It is the *S. lacustris* of continental writers; and received its present designation from Sir W. Jardine, who, having found it in Loch Awe and other lochs of Scotland, supposed it was a new species. He named it *ferox*, on account of its exceedingly rapacious habits. The flavour of this fish is indifferent when compared with the salmon and salmon-trout. These fish are generally caught from a boat, and require a rod and line of great strength, on account of their power and activity.

The *Salmo salmulus*, the Parr, or Samlet, is sometimes called a trout. It is the smallest of the British *Salmonidæ*. It very nearly resembles the young of the Salmon, and they were confounded under the name of Parr till Mr. Shaw of Drumlanrigg pointed out the fact that many of the fishes called Parr were young salmon. Some persons suppose from this that all Parr are young salmon; but this is erroneous, as the true Parr are found in the rivers at seasons of the year when a young salmon is not to be found at all.

The other species of *Salmo* inhabiting Great Britain are the *S. umbla*, the Northern Char, and *S. salvelinus*, the Welsh Char.

(Wilson's *Rod*; Yarrell's *British Fishes*.)

TROVER (from the French word *trouver*, 'to find'), the name of a special action on the case. It is applicable to questions respecting the right to personal chattels only. It may be brought either by the owner, or by a bailee, as a carrier, or by a mere finder as against all except the owner. The declaration states that the plaintiff was lawfully possessed as of his own property of certain personal chattels, naming them distinctly, their amount and value; that he afterwards casually lost them, and that they came into the possesion of the defendant by *finding*, who afterwards *converted* them to his own use; for which the plaintiff claims damages. This form and the fiction respecting the finding

were contrived for the purpose, by assuming a right of possession in the defendant, of enabling the parties to try the bare question as to the right between the plaintiff and defendant to recover or retain the goods. In answer to this declaration the defendant may either plead not guilty, under which plea, since the new rules, the only question raised is the mere fact of the actual conversion, or he may plead specially the circumstances under which, admitting the *conversion*, he claims a right to detain the goods. The fact of the conversion is proved by showing that the defendant upon request distinctly refused to deliver up the goods, or has destroyed them, or has assumed the right to dispose of them. The action is not maintainable by one joint tenant, or tenant in common, or partner against another, unless in the case where the chattel has been destroyed by the other. This rule is founded on the principle (of the English law), that the possession of one is, by reason of the joint property of all, held to be the possession of all, and therefore no act of conversion can be said to have been committed.

The other pleas which are an answer to this action are, a denial of the property of the plaintiff in the chattel, or the statute of limitations that six years have elapsed since the act of conversion was committed; or any circumstances showing that the defendant has a right to detain the goods, as from having a lien upon them, &c.

The plaintiff must prove that the nature and value of the goods correspond to a certain extent with the statements in the declaration. If he succeeds in obtaining a verdict, the jury may give damages to the amount of the value of the goods, and also such sum in addition as may cover the amount of interest during the time subsequent to the conversion. This action differs from the action of detinue as being brought to recover damages, while the object of the action of detinue is to recover the actual goods.

TROWBRIDGE, SIR THOMAS, of the date of whose birth we have no record, was brought up in the naval service under Admiral Sir Edw. Hughes, in the East Indies; was made a lieutenant in 1780, and a commander and post-captain in 1782. On his return from an expedition in the Indian seas, in command of the Castor frigate, of 32 guns, with a convoy of merchantmen in charge, he was taken prisoner by the French; but was retaken by Lord Howe, in his great victory of June 1, 1794. Lord Howe gave the command of the Sans Pareil, in which he had been a prisoner, to Trowbridge; and he commanded the Culloden, of 74 guns, in the victory of Feb. 14, 1797, under Earl St. Vincent. In 1799 Trowbridge resigned the blockade of Alexandria, in which he had been engaged, to Sir Sidney Smith, and was subsequently engaged about the coast of Italy in co-operating with the Russians and Austrians. In Nov., 1799, Trowbridge was made a baronet. He had for some time previously borne the rank of commodore, and on his return to England, in 1801, he was made captain of the Channel fleet, and subsequently a lord of the Admiralty. In April, 1804, he was made an admiral, and in 1805 he was sent to the East Indies in the Blenheim, with a convoy of ten merchant vessels. In 1806 the Blenheim ran aground in the straits of Malacca, and was seriously injured; but after repairing her in a temporary manner at Pulo Penang, Trowbridge sailed in her, under jury-masts, to Madras. He set sail for the Cape of Good Hope, Jan. 12, 1807. The Blenheim was last seen on Feb. 1, near Madagascar, in a violent gale, and exhibiting signals of distress; and nothing was ever discovered respecting the fate of her crew.

TROY (Τροία, Τροίη, or Τροΐα) is the name both of the country in which the city of Troy was situated and of the city itself. The country of Troy, more commonly called Troas, or Troad, formed the N.W. part of Mysia in Asia Minor. In after-ages this tract of country preserved its name, and under the Romans it formed a separate district of Mysia. It was bounded on the W. and N.W. by the Ægean Sea and the Hellespont, the extent of its coast being from the promontory of Lectum on the south to the river Rhodius, which falls into the Hellespont below Abydos on the north. Its eastern boundary was a ridge of Mount Ida, extending from the source of the Rhodius, to the sea-coast near the promontory of Lectum. Strabo gives a much greater extent to the Troad, making it reach to the river Æsépus on the east, and to the Caïcus on the south (xiii., p. 581–586); but, in taking this view, Strabo included as subjects of the king of Troy several states which were only his allies. (Homer, 'Iliad,' ii. 824, &c.)

The inhabitants of the Troad were probably of Thracian origin. At the time of the Trojan war they had reached a higher state of prosperity and civilisation than the Achæans, who attacked them in the Trojan war. There seems however to have been no considerable town in the district except the capital, Ilium or Troy. The whole of the Troad is intersected by the branches of Mount Ida.

The topography of Troy or Ilion, and of the whole district of the Troad, is a subject on which much has been written. Those who wish to investigate it may refer to the works of Pococke, Le Chevalier, Choiseul Gouffier, Spon, Wood, Wheeler; Leake, 'Travels in Asia Minor,' c. 6; Forchhammer, in the 'Journal of the Geographical Society of London,' vol. xii., whose essay is accompanied by a topographical survey of the Plain of Troy, by Captain Graves, T. A. B. Spratt, and other officers of the Royal British Navy; Von Eckenbrecher, 'Ueber die Lage des Homerischen Ilion,' in the 'Rheinisches Museum fur Philologie,' for 1842, p. 1–49, with two maps, one representing the ancient, and another the modern condition of the country.

TROY. [New York.]

TROY WEIGHT. Neither the etymology nor the time of introduction of this denomination is well known; the received opinion is that it took its name from a weight used at the fair of Troyes. This is likely enough, since we find more than one large town the weights of which became standards: thus we have the pound of Cologne, of Toulouse, and perhaps also of Troyes.

The troy pound is the legal standard, though

only actually used in weighing precious metals and stones, and apothecaries' drugs. There is no doubt that it was originally the pound of silver, the pound sterling, and there is evidence that this pound was sometimes described as divided into twenty parts called sterling shillings. The famous statute of Henry I. (A.D. 1266) makes a standard for it from the weight of ears of wheat.

The pound troy is now divided, for gold and silver, into twelve ounces, each ounce into twenty pennyweights, and each pennyweight into twenty-four grains. But for medicines, it is divided into twelve ounces, each ounce into eight drams or drachms, each drachm into three scruples, and each scruple into twenty grains. A cubic foot of water weighs 75.7374 pounds troy.

TROYES, the capital of the French department of Aube, is situated in the middle of a vast and fertile plain on the left bank of the Seine, which partly surrounds the town and supplies numerous canals that circulate in the interior of the city, in 48° 18′ N. lat., 4° 4½′ E. long., 110 miles by railway S.E. from Paris, and has tribunals of first instance and of commerce, a chamber of commerce, a council of Prud'Hommes, a society of agriculture, science, and art, a diocesan seminary, a college, and 26,376 inhabitants. It occupies the site of the chief town of the Celtic *Tricasses*, which the Romans called *Augustobona*. On the decline of the Roman power, it had the name Tricasses or Trecassæ, and later still Trecæ. Attila, after his defeat by Aëtius in 441, retreated upon Troyes, which was saved from destruction by its bishop, St. Loup, who made a treaty with the barbarian and accompanied his army as a safe-conduct to the Rhine. It was burnt by the Normans A.D. 889, and in the feudal period was the capital of the important county of Champagne. Troyes was taken by the Duke of Bourgogne in 1415; and here, in 1420, the marriage of Henry V. of England with Catherine of France was concluded, and the treaty arranged by which Henry was to succeed Charles VI. on the throne. Troyes was retaken from the English by Charles VII., in 1429.

The Seine flows on the northern and eastern sides of the town, which is entered by six gates, and surrounded by old ramparts which are planted with trees: the ditch is laid out as a garden. There are five suburbs. The streets are, with some exceptions, narrow and crooked. The houses, many of which are of wood, are generally ill built; the gables towards the streets are of wood, painted or plastered, frequently adorned with coarse carving, and have dark penthouses, which overhang the shops; but these old structures are gradually giving way to well-built houses. The cathedral of St.-Pierre is a fine specimen of Gothic architecture: the height and width of the nave, the beautiful stained-glass windows which adorn the aisles, three beautiful rose windows, one of which is above the central door, and the handsome pavement of the choir, are among the features which attract the greatest notice. The church has never been completed: there were to have been two western towers, but one only, about 205 feet high, has been erected. The church of St.-Jean is remarkable for the narrowness of the nave: it contains a fine tabernacle sculptured by Girardon, and a fine painting of the baptism of Christ, by Mignard. The church of St.-Remi contains a figure of Christ in bronze, by Girardon, regarded as one of the finest works of that sculptor. The churches of La Sainte-Madeleine and St.-Urbain are considered as very beautiful, and St.-Nicolas has a handsome front. All the churches of Troyes are more or less rich in painted windows: those of St.-Nizier and St.-Pantaléon are in black and white; those of La Madeleine are equally beautiful for colouring and for design. The Hôtel-Dieu is a handsome building of the last century; the town-hall has a handsome stone front, adorned with columns of black marble; the gate of St.-Jacques, which is flanked by two towers and surmounted by a light spire, is sometimes ascribed to Cæsar. There are besides these the theatre, the episcopal palace, the wine-mart, the abattoirs, the shambles, and the gaol and house of correction. The public library, which is formed in a great measure of the collections found in the suppressed monasteries and contains 55,000 volumes, besides 5000 MSS., is kept in a spacious hall 164 feet long, 32 wide, and 22 high.

The manufactures of Troyes are important: the chief articles made are—all kinds of cotton and woollen goods; linen, printing paper, playing cards, chamois and other leather, gloves, hats, wool-cards and combs, spinning-wheels, knitting-needles, agricultural implements, furniture, musical strings, leaden utensils and wares, and whiting. There are dye-houses, bleach-grounds, bleaching-houses for wax, tan-mills, and several printing-offices. The commerce in these various products, in corn, peas, beans, wine, brandy, colonial produce, hemp, wool, iron, lead, zinc, timber, &c., is greatly facilitated by the numerous good roads that intersect the town, by the canal of the Upper Seine, and especially by the railroad to Paris through Montereau. There are five fairs, two of eight days each.

Troyes gives title to a bishop, whose see is the department of Aube. It is the native place of Pope Urban IV.

TRUCK SYSTEM. TRUCK ACT. The term Truck, which means exchange or barter, is now used to signify the payment of wages of labour in goods, and not in money. By the truck-system is meant this mode of paying wages, together with all its tendencies and results. The Truck Act, 1 & 2 Wm. IV., cc. 36, 37, is an act passed in 1831, which, repealing all the previous acts passed for the same purpose, made stricter provisions for the prevention of payment of wages in truck in the departments of industry therein enumerated. The wages of agricultural labourers and domestic servants are exempted from the operation of the act. The evidence published in the Report of the Select Committee of the House of Commons appointed in the session (1842), 'to enquire into the operation of the law which prohibits the payment of wages in goods, or otherwise than in the current coin of the realm, and into the alleged violations and defects of the existing enactments,' shows that, notwithstanding the Truck Act, the truck-system is still in extensive operation in mills, factories,

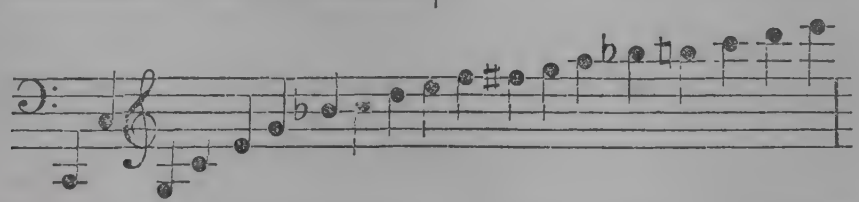
iron-works, collieries, and stone-quarries in the kingdom, and abundantly illustrates the evil tendencies of the system.

The chief part of the evil of what is called the truck-system is incidental, and not essential to the payment of wages in truck, and arises out of the power of the master over the workman, which enables the master to use this mode of paying wages to defraud and oppress the workman. A master may pay the wages of his workmen wholly or in part in truck, in articles of food, clothing, &c., either by agreement, or with only the understood consent of his workmen; and if he supply these articles at prices no higher than those at which they are to be procured elsewhere, and study to meet the various wants of the workmen and their families, the utmost harm that can result is the loss to the workmen of the moral and economical lessons which the disbursement by themselves of weekly money-wages is fitted to supply, and the interference with the business and profits of neighbouring retail shopkeepers; and there will always in such cases be some advantage to set against these, so far as they go, evil results. Where the truck-system acts beneficially, it is owing entirely to the justice and benevolence of the individual truck-masters. On the character of the master everything depends. In the hands of masters of opposite character, and under circumstances, whether of scarcity of employment, of isolated situation, or of combination among masters in the same business, or through an extensive district, which place the workman more or less at the mercy of his employer, the payment of wages in truck may be, and continually has been, and is still extensively, used for the defrauding and oppressing of workmen.

TRUE. (Astronomy.) This word is used in a somewhat technical sense. The place which a star or planet appears to occupy in the heavens is not called its true place, but that which it would occupy if the effects of refraction, parallax, &c., were removed, that is, if the spectator saw from the centre of the earth, and without the light passing through any refracting medium.

TRUFFLE. [TUBERACEÆ.]

TRUMPET, a musical instrument of the highest antiquity. It is a single tube eight feet long, less in diameter than the horn, doubled up in a parabolic form, sounded by means of a mouthpiece, and subject to the same acoustical laws which govern all instruments of this class. [HORN.] The natural scale of the trumpet is as follows:—



By the assistance of a small brass tube, called the tuning-pipe, or shank, by which the tube of the trumpet is lengthened, the above number of notes may be increased.

Music for the trumpet, as in the instance of the horn is always written in the natural key of C, and the key to which the instrument is to be adapted is pointed out by the composer.

TRUNCATED, cut off, or abridged. Thus the part of a cone or pyramid which remains when the vertex and parts adjacent are separated from the rest by a plane section, is called a truncated cone or pyramid.

TRURO. [CORNWALL.]

TRUSSING. The rods or bars which are added to a girder for the purpose of trussing or supporting it may be applied in two sets, one on each side of the girder, and connected together by short cross-pieces at the necessary points; or the beam or girder itself may be divided longitudinally into two halves, or flitches, separated just so far as to admit a single truss between them, and held in the right position by the insertion of small blocks. One of the simplest methods of trussing girders is that in which the beam rests upon walls at its extremities, and has two inclined struts, resting on notches in the timber at the lower end, and supported at the centre or junction by a vertical kingpost, screwed by a nut beneath the beam. This form is improved by connecting the lower ends of the inclined bars by an iron rod stretching in a perfectly straight line, and capable of being brought to any required degree of tension by means of screws or keys.

Cast-iron beams are frequently trussed with wrought-iron rods, in a similar manner to those of wood, and are applied to purposes for which great strength is required.

TRUST AND TRUSTEE. A trust, which is in fact a new name given to a use, is defined by Lord Coke in the words employed by him for the definition of a use: 'A confidence reposed in some other, not issuing out of the land, but as a thing collateral, annexed in privity to the estate of the land, and to the person touching the land, for which *cestui que use* has no remedy but by *subpœna* in Chancery.' (Co. Litt., 272 b.) A trustee is he who undertakes to discharge a trust; and a *cestui que trust*, is the person who is entitled to the benefit of a trust.

Owing to the settlements made upon marriage, and the dispositions of property made by will, a great amount of property is in the hands of persons who hold it in trust for certain purposes defined by the instruments which create the trusts. There are also trusts for charitable purposes and others. The law relating to trusts is accordingly implicated with the law of property, and it also contains the rules as to the duties and powers of trustees, both with reference to the *cestuis que trusts* and other persons. The Court of Chancery has the sole jurisdiction in trusts.

Trusts may be created either by deed or by testament. The Roman Fidei-commissum was only created by testament, and it was a testamentary disposition by which the testator gave something to one person, and imposed on him the duty of transferring it to another. It is stated that there

were no legal means of compelling the discharge of this duty till the time of Augustus, who gave the consuls jurisdiction in Fidei commissa. Under Claudius prætors were appointed to exercise jurisdiction in Fidei commissa.

TRUXILLO. [Peru; Estremadura, *Spanish.*]

TRYPHIODO'RUS, a Greek grammarian and a poet, who was a native of Egypt, and appears to have lived in the sixth century of our æra, about the reign of the Emperor Anastasius. Particulars of his life are not known. We possess by him an epic poem of 681 verses, on the destruction of Troy, which bears the title Ἰλίου ἅλωσις. The narrative of this poem is exceedingly dull, and little better than a mere chronicle of events. Besides this poem, which is the only work of Tryphiodorus now extant, he wrote various others.

TRYPHONI'NUS, CLAUDIUS, a Roman jurist who lived under Septimius Sevérus and his son Antoninus Caracalla. He wrote notes on the works of Cervidius Scævola, and twenty-one books of Disputationes, from which there are excerpts in the Digest. There is a rescript of Antoninus to him ('Cod.' 1, tit. 9, s. 1), but whether in his capacity of governor of Syria or as the agent of the Fiscus is uncertain. He is cited once by Paulus.

TSCHERKASK. [Don Cossacks.]

TSCHUGUJEW. [Slobode-Ukraine.]

TUAM. [Galway.]

TUBER. [Stem.]

TUBERA'CEÆ, a section of the suborder *Gasteromycetes*, of the natural order of *Fungi*. The species of these genera are not numerous, and are found very generally diffused throughout the temperate parts of the world, and growing buried beneath the soil. *T. cibarium*, the Common Truffle, is known by its surface being warty and of a black colour. It is found buried in the soil of woods, especially beech-woods, sometimes at the depth of 10 or 12 inches or more. It is a native of Europe and is also found in Japan and the East Indies. It grows abundantly in some parts of England. This is one of the few species of the natural order *Fungi* that is used as an article of diet. For this purpose they appear to have been used by the Greeks and Romans. *T. moschatum*, Musk-Scented Truffle, has a roundish, smooth, blackish appearance, and is a much rarer plant than the last. It has been found in Great Britain, and is characterised by the musky odour which it gives out.

TUBERCULARI'NI, a tribe of plants belonging to the suborder *Coniomycetes*, of the order *Fungi*. It includes the genera *Tubercularia* and *Fusarium*. All the species are found on dead and decaying sticks and branches, and trunks of trees, and on the decaying stems of various herbs.

TUBEROSE. [Polyanthes Tuberosa.]

TUBI'COLÆ. The *Tubicoles* of Cuvier, commonly called by the French *Pinceaux de Mer*, form the first order of his Annelids.

The *Tubicoles* have branchiæ in the form of plumes, or of small arborisations, attached to the head or on the anterior part of the body, and nearly all inhabit tubes.

Of those which inhabit tubes, some form a calcareous homogeneous one, resulting probably from their transudation, like the shells of the mollusca, but they do not adhere to it by means of muscles: others construct a tube by agglutinating grains of sand, fragments of shells, or particles of sand by means of a membrane which they doubtless transude also: there are others again whose tube is entirely membranous or horny. ('Règne Animal.')

To the first category belongs the genus

Serpula.

The species of this genus are the *Tuyaux de Mer* of the French, and their twisting calcareous tubes cover stones, shells, and other submarine bodies. The section of these tubes is sometimes round and sometimes angular, according to the species.

Cuvier describes the animal as having a body composed of a great number of segments; its anterior part enlarged into a disk, armed on each side with many bundles of stiff bristle-like appendages, and on each side of the mouth a plume of branchiæ in the form of a fan, ordinarily tinted with vivid colours. At the base of each plume is a fleshy filament; and one of the two, that to the right or left indifferently, is always prolonged and dilated at its extremity into a disk of different configuration, which serves as an operculum, and closes the aperture of the tube when the animal retires within it. Cuvier further observes that the most common species having this disk in the form of a funnel, some naturalists have mistaken it for a proboscis: but it is not pierced; and the other species have it more or less of a club-shape.

The number of species of *Serpula* (Lam.) admitted into the last edition of 'Animaux sans Vertèbres,' is 60 recent and fossil; and M. Milne Edwards adds many more at the end of the genus; but he observes that very little is known of the specific differences presented by these animals, and that many of the living and all of the fossil species are characterised in a very doubtful manner. The fossils are said to be found in the tertiary, greensand, chalk (environs of Münster and Maastricht), lias, and oolite beds, &c. Mr. Lea describes a species *Serpula ornata*, from the tertiary of Alabama (Claiborne beds).

Other genera are named *Sabella*, *Terebella*, *Amphitrite*, *Siphostoma*, *Spirorbis*, &c.

The following situations have been noticed as frequented by these annelids:—

Serpula (including *Vermilia* and *Galeolaria*, Lam.) may be said to be, generally, littoral, attached to rocks, stones, shells, crustaceans, corals, and other marine bodies.

Spirorbis is found on sea-weed, shells, &c., and nearly in the same situations.

Sabella occurs on the coasts, on shells, &c., and generally in shallow water.

Terebella haunts nearly the same localities.

TUBICO'LIDÆ. The *Tubicolées* of Lamarck form the first division of his *Conchifères Crassipèdes;* and he commences his *Conchifera* with *Aspergillum*, and terminates them with *Lingula*, the last genus, according to him, of the *Brachiopoda*.

Lamarck observes that the Tubicolidæ are undoubtedly conchifers, but of such great singularity,

that some among them have been referred to other classes by modern naturalists; and he adds that it is singular to find a bivalve shell enclosed in a testaceous tube, and still more singular to see it incrusted in or built into the wall of that tube, and concurring to complete such wall.

The singularity of the Tubicolidæ, as well as that of the *Pholades*, has, he further remarks, caused a misconception of the real essentials of the shells which belong to the family, namely, two similar, equal, regular valves, articulated by a hinge. As in the shells of the Tubicolidæ, there are some which have accessory pieces apart from their valves; so, as one sees in the *Pholades*, some naturalists have taken them for multivalve shells, a notion which has given rise to very odd associations.

But, continues Lamarck, the doubts relative to the classification of the Tubicolidæ and to those similarities which they exhibit to the *Pholades* are evidently dissipated by the transitional characters which connect *Aspergillum* with *Clavagella*, these last to the *Fistulanæ*, and afterwards to the *Teredines*, which themselves approach the *Pholades*.

Finally, Lamarck points out that the animals of this family are borers, burrowing in stone, wood, and even in thick shells; but some, nevertheless, live in the sand.

The following six genera are arranged by Lamarck under this family—*Aspergillum*, *Clavagella*, *Fistulana*, *Septaria*, *Teredina*, and *Teredo*.

TÜBINGEN, a city in the Würtemberg province of Schwarzwald, is situated on the left bank of the Neckar, over which there is a stone bridge, at its confluence with the Ammer, about 20 miles S. from Stuttgardt, and has 8600 inhabitants. The town, which is irregularly built in the old style, lies on a slope. The most regular portions are the two suburbs, one of which is built on the right bank of the Neckar. Tübingen is chiefly interesting on account of its university, founded in 1477, which is governed by a chancellor, appointed by the king, and a senate. The university has faculties of medicine, jurisprudence, philosophy, Protestant and Catholic divinity, and political economy. There are thirty professors in ordinary, who form the Senate, and six extraordinary. Attached to it are a library of 60,000 volumes, a good collection of natural history, a cabinet of medals, a collection of mathematical, astronomical and philosophical instruments, an observatory, and a botanic garden. Among the principal public edifices, besides the university, are St. George's church; the town-hall, built in 1435; the Protestant seminary; the Catholic college; the museum; the court of justice for the province; the city hospital, a very spacious building; and the infirmary and lying-in hospital. The town has several printing-offices, an anatomical theatre, dye-houses, breweries, and woollen-cloth factories. There are many saw, fulling, and other mills on the Neckar and the Ammer.

TUBIPORÆA, or TUBIPO'RIDÆ, a group of *Actinozoaria*, forming the first family of the *Zoophytaria* of Blainville, the other families being *Corallia*, *Pennatularia*, and *Alcyonaria*. The Tubiporidæ are thus defined:—

Animals provided with internal ovaries, and eight pinnated tentacula, and contained in elongated cylindrical cells; cells calcareous or coriaceous, with a round terminal opening, fixed by the base, and not united into a real common polyparium. (This last part of the characteristic is not clear.)

Envelope, fleshy. Genera, *Cuscutaria*, *Telesto*, *Cornularia*, *Clavularia*.

Envelope, calcareous. Genus, *Tubipora*.

TUBIZE. [BRABANT, SOUTH.]

TUBULIBRANCHIA'TA. The *Tubulibranches* form Cuvier's second order of *Gastropods*, and he says that they ought to be detached from the *Pectinibranchiata*, to which however they very nearly approximate, because their shell, which is in the form of a more or less irregular tube, the commencement of which only is spiral, fixes itself upon various bodies: therefore, adds Cuvier, they are necessarily self-fecundatory.

Cuvier's *Tubulibranches* consist of the genera *Vermetus*, *Magilus*, and *Siliquaria*.

Vermetus.

The *Vermeti* have a tubular shell, the whorls of which, in the early age of the animal, form a kind of spire, but afterwards are prolonged into a tube more or less twisted or bent, like those of the tubes of *Serpulæ*. [TUBICOLÆ.] The shell is ordinarily fixed in an interlaced group of the same species, or partly enveloped in Lithophytes.

Magilus. [MAGILUS.]

Siliquaria.

Cuvier remarks that *Siliquaria* resembles *Vermetus* in the head, in the position of the operculum, and in the tubular irregular shell, which has however throughout its length a slit which follows all its windings, and which corresponds with a similar slit in the mantle which covers the branchial cavity. Along the whole length of this slit adheres a branchial comb, composed of a great quantity of foliations, distinct, and, as it were, tubular. Linnæus placed them with the *Serpulæ*, and Cuvier observes that in these later times some have believed that they belong to the class of *Annelids*. Lamarck supposed *Siliquaria* as well as *Vermilia* to be approximated to the *Serpulæ*.

TUBULIPO'RIDÆ, or TUBULIPORÆA, the second family of *Polypiaria solida*, in Blainville's arrangement of the *Actinozoaria*. The characteristics appear by no means exact, but are thus stated by Blainville:—

Animals contained in cells of a tubular figure, with a round mouth, which are accumulated irregularly, so as to form an attached unsolid polyparium. (The animals are only known in the genus *Tubulipora*.)

TUCA'NUS (the Toucan), a southern constellation of Bayer, situated between Phœnix and the south pole, and near to the bright star in Eridanus.

TUCKER, ABRAHAM, was born Sept. 2, 1705. His father, a wealthy merchant in London, died in his son's infancy, leaving him to the guardianship of a maternal uncle. In 1721 Tucker entered as a gentleman commoner at Merton College, Oxford, and about 1724 he went to the Inner Temple, but was never called to the bar.

In 1727 Mr. Tucker purchased Betchworth Castle, near Dorking, with an extensive estate attached. He married in 1736, and his wife died in 1754, leaving two daughters. In 1756, or thereabouts, Tucker began his great work 'The Light of Nature Pursued.' The first specimen of his work was published in 1763 under the title 'Free Will:' this was a selection from the four octavo volumes of the 'Light of Nature Pursued,' which he gave to the world in 1765. In the meantime, a criticism in the 'Monthly Review' on the 'Free Will' led him to publish a reply, under the title 'Man in Quest of Himself; by Cuthbert Comment.' He published the 'Light of Nature Pursued' under the fictitious name of Edward Search. The remaining volumes of the work, the composition of which, together with magisterial duties and the superintendence of his estate, occupied the remainder of his life, were edited by his daughter, after his death, which took place in 1774. He had been blind for some years previously.

The 'Light of Nature Pursued' is a desultory work, and not a systematic treatise, on mind and morals, and is of a practical rather than a theoretical character. Its striking qualities are ingenuity and fertility of illustration, a rich quiet vein of humour, and a high moral aim.

TUCKER, JOSIAH, D.D., was born at Laugharne in Caermarthenshire, in 1711. He was sent to Ruthin School in Denbighshire, where he obtained an exhibition at St. John's College, Oxford. Shortly after leaving the university he entered into holy orders, and became curate of All Saints, Bristol. He next became curate of St. Stephen's, Bristol, and was appointed a minor canon in the cathedral of that city. Dr. Butler, the bishop of his diocese, next appointed him his domestic chaplain, and afterwards obtained for him a prebendal stall in the cathedral of Bristol, and also the rectory of St. Stephen's, in 1749. In 1758 he became dean of Gloucester, and about the same time took his degree of D.D.

In 1748 he published 'A Brief Essay on the Advantages and Disadvantages which respectively attend France and Great Britain with regard to Trade.' In this essay he condemned both the French and English systems of taxation, protective duties, and monopoly generally. For some years he continued to send forth valuable contributions to the science of political economy, all tending to discourage exclusiveness in national commerce, and to promote peace and the abolition of restrictive duties.

The most remarkable of the commercial tracts of Dean Tucker was published in 1785, 'Reflections on the Present Matters in Dispute between Great Britain and Ireland.' It advocates the abolition of the East India Company's monopoly, a free exportation and importation of grain, and the repeal of the Navigation Act.

In many of his pamphlets he combated the principles laid down by Mr. Locke, and at length devoted an elaborate work to their refutation. In 1781 his 'Treatise concerning Civil Government' appeared.

It is not surprising that the political works of so able a writer should have attracted more public notice than his ministrations in the church (which he was more than once accused of neglecting), or even his published sermons and religious treatises. But in none of his political writings did he show more ability than in his 'Apology for the present Church of England,' and his 'Letters to Dr. Kippis.' He published another valuable tract in 1774, entitled 'Religious Intolerance no Part of the General Plan either of the Mosaic or Christian Dispensation.' At about the same time he published 'Seventeen Sermons on some of the most important Points of Natural and Revealed Religion.' His numerous publications have never been collected, and some of them are now extremely scarce. He died Nov. 4, 1799.

TUCUMAN. [Plata, La.]

TUDELA. [Navarra.]

TUDOR. [Henry VII.]

TUESDAY. [Week.]

TUFA. [Travertin.]

TUFF. The accumulations of scoria and ashes about a volcanic crater, which are re-aggregated so as to make a coherent or solid mass, are termed Volcanic Tuff. Similar but more ancient aggregations of the products of heat, re-aggregated into firm, solid, or even highly compact rock, are called Trap Tuff.

TULA, a government of European Russia, situated between 52° 53′ and 54° 56′ N. lat., 35° 54′ and 38° 50′ E. long., is bounded N. by Moscow, E. by Riasan, S.E. by Tambow, S. by Orel, and W. by Kaluga. The area is 11,714 square miles, and the population in 1846 was 1,227,000. The surface is an undulating plain, where hardly anything is to be seen but boundless corn-fields or meadows, this province being one of the best cultivated in the empire. It is exceeded in density of population by the government of Moscow only. The soil is dry, and generally poor, and owes its fertility to skilful cultivation. The principal river is the Oka, which comes from Kaluga, and partly forms the boundary towards Moscow and Kaluga. The Don is little more than a brook in its short course in this government. There is however no want of water, there being above 200 small rivers. The inhabitants are Russians, with a few German families living among them. The bishop of Tula and Bjelew is at the head of the clergy. The government is divided into twelve circles. Except in the chief towns there are no manufactures; the country-people make their own woollens and linen.

Tula, the capital, situated in 54° 15′ N. lat., 37° 25′ E. long., at the confluence of the Tulitza and the Upa, is an important commercial and manufacturing town, with 51,000 inhabitants, 28 churches, 2 monasteries, a seminary and a gymnasium, 17 poorhouses, a theatre, a foundling hospital, and a house of correction: there is likewise an institution, called the Alexandrium, for the education of children of noble families. The imperial manufactory of arms employs above 7000 workmen, has two iron-foundries, and provides the whole army with arms, producing annually 70,000 muskets and 25,000 side-arms, which are of excellent quality and beautiful workmanship: cutlery

of various kinds is also manufactured here. There are in Tula numerous tanneries and breweries, manufactories of Russia leather, candles, soap, beet-root sugar, and great tallow-melting houses, besides manufactories of woollens, linen, sealing-wax, paint, and Prussian blue. There is a great trade also in corn and hemp.

Bjelew, situated on the Oka, in the western part of the government, is a large old town, with a rampart and moat, and about 8000 inhabitants: it has fifteen churches; a convent, with a seminary; a nunnery; and several public buildings. There are several tanneries, breweries, tallow-melting houses, and manufactories of hardware, especially knives.

TULIP. [TULIPA.]

TULIP-TREE, the English name of the *Liriodendron tulipifera*, a tree belonging to the natural order *Magnoliaceæ*. In America, where it is a native, it is also known by the names of White Wood, Canoe Wood, Saddle-Tree, Tulip-Bearing Lily-Tree, Virginian Poplar, and the Poplar. There is only one species of the genus, the *L. tulipifera*, which is a handsome tree. There are three varieties of this tree described. It is one of the most magnificent inhabitants of the forests of the temperate parts of North America. It abounds in the middle states of the North American union, in the upper parts of the Carolinas and of Georgia, and is still more abundant in the western country, particularly Kentucky. These trees sometimes attain a height of 120 feet or more, and their trunks measure 20 feet in circumference. The most common dimensions however are from 70 to 100 feet in height, and from 18 inches to three feet the diameter of the trunk.

TU'LIPA, a genus of plants belonging to the natural order *Liliaceæ*. All the species are herbaceous plants, developed from a bulb. About thirty species have been described.

T. sylvestris, the Wild Tulip. This is the only species of tulip that is a native of Great Britain. In England it occurs in the counties of Norfolk, Suffolk, Hertfordshire, and Middlesex, in a chalk soil. It has also been found in Scotland. It is found in the southern parts of Germany, in Switzerland, Italy, and France. It has yellow flowers, and blooms in April and May. *T. Oculus Solis*, the Agen Tulip, was found at Agen in France, and also grows wild in Italy, Germany, and other parts of Europe. The flowers are large and bell-shaped, of a fine scarlet-red colour, each petal marked with a broad black yellow-edged spot at its base. It blossoms in April and May. *T. suaveolens*, the Early Dwarf Tulip, is supposed to be a native of the south of Europe. It blooms in March and April. The flowers are of a scarlet colour, edged with yellow, and give out a sweet scent, for which this plant is more cultivated than on account of the colour or form of its flower. *T. celsiana*, Small Yellow Tulip, blossoms in March or April, and is a native of the south of Europe, and of the banks of the Wolga. *T. Clusiana*, Red and White Italian Tulip, was at one time supposed to be a Persian plant, but it has been found wild near Toulon in France, and also in Italy and Sicily. *T. biflora*, the Two-Flowered Yellow Tulip, is a native of the salt deserts about the Wolga, and is found in company with *T. celsiana*. It is not more than half the size of that plant, blossoms earlier, and has less duration. The flowers are fragrant. *T. Gesneriana*, Common Garden Tulip. Of all the species of tulip this one is the best known, and has perhaps had more attention bestowed upon it than any other plant that produces only flowers. This species of tulip grows wild in the Levant, and appears to have been cultivated by the Turks in their gardens from an early period.

The tulip was first introduced into France in 1611. It was in Holland however that the tulip was destined to make the greatest impression. In the early part of the 17th century the passion for the possession of these plants became so strong, that dealing in them became one of the most important money speculations, and the bulbs of tulips were sold and resold at enormous prices, in the same manner as stocks are on the Stock Exchange of England. It became in fact a gambling transaction, in which persons ventured their capital, in the hope that particular kinds of tulips would realise a higher price.

TULL, JETHRO, a gentleman of moderate fortune, who lived in the beginning of the last century, and zealously devoted a great part of his life to the improvement of agriculture. He possessed a small estate near Hungerford, on the borders of Oxfordshire and Berkshire, and has generally been considered as the father of the drill and horse-hoeing husbandry. Having observed the good effects of the cultivation of many plants in regular rows, and of frequently stirring the intervals between them, he concluded rashly that the earths very finely divided, together with moisture, constituted the whole of the food of plants, and that consequently stirring and pulverising the soil was a complete substitute for manuring. He attempted to introduce this system into the field; and the first trials appeared to be so successful, that the New Husbandry, as it was called, was strongly recommended for general adoption. The error however was discovered in the end, and Tull, who had expended large sums in experiments, became so embarrassed that he lost his property, and it is said died in prison.

Tull published, in 1731, detached essays on his new mode of cultivation, which were in 1751 collected into one volume, with copious notes by himself. In 1822 Mr. Cobbett edited a new edition of his works.

TULLAMORE. [KING'S COUNTY.]

TULLE. [CORRE'ZE.]

TULLINS. [ISE'RE.]

TULLOW. [CARLOW.]

TULLUS HOSTI'LIUS, the third king of Rome, reigned from B.C. 673 to 641. He is called a grandson of Hostus Hostilius, who fell in a battle against the Latins in the reign of Romulus. His reign is described as the very reverse of that of his predecessor, the pious and peaceable Numa, and he himself as even more warlike than Romulus. The most memorable event of his reign is the war with Alba, which is celebrated

in ancient story on account of the single combat between the Horatii and Curiatii, and which was followed by the destruction of Alba. The inhabitants of Alba were transferred to Rome, where the Cælian Hill was assigned to them as their habitation. Several of the noble Alban families were incorporated with the Roman patricians, and the number of Roman equites was likewise doubled, while the great mass of the Alban population were treated as an inferior race. A war now arose between the Romans and the Sabines, in which the Sabines were defeated near the Silva Malitiosa. But after these successful undertakings the gods afflicted Rome with a pestilence, which was preceded by several awful prodigies. The king however continued his warlike pursuits, until at last he was seized with the disease. In order to propitiate the gods, he consulted the 'Commentarii' of Numa, which contained rules about the manner in which the wrath of the gods was to be appeased. He found the formula with which Numa had performed his solemn sacrifices to Jupiter Elicius. Tullus Hostilius attempted to do the same, and to call down the god, but he committed a mistake in his use of the sacred formula, and the god in his anger destroyed the king and his whole house by lightning. This is the story of Tullus Hostilius in Livy (i. 22, &c.).

TUMBREL, or TUMBRIL, a machine formerly used for the punishment of scolding women, consisting of a stool or chair attached to the end of a long pole, mounted in such a manner that the chair, with the offender placed in it, might be swung over a pond, and immersed as often as might be necessary. The tumbrel was also used as a punishment for brewers and bakers who transgressed the laws relating to them. The name is also applied to the covered carts used to carry tools, &c., in a train of artillery.

TUMOUR. It is not possible to define exactly the diseases which are commonly classed under the name of Tumours, and any definition in which the character of *swelling* (which is the true meaning of tumour) is included is unnatural: for there are several diseases which agree in the most important respects with some of those called tumours, but are not attended by any obvious enlargement or swelling of the part in which they are situated; and the same disease exists in some cases with and in others without swelling. The greater part of the diseases which have been classed as tumours are examples of a large class of what may be called morbid or parasitic growths—diseased structures, which are not mere alterations of previously existing parts, but new organisms or living substances which have grown within the tissues of the body by powers of development peculiar to themselves, and which depend upon the surrounding parts only for their supply of blood or other nutritive fluid. In this class are included all those diseases described as solid or sarcomatous tumours, and those which are closely related to some kinds of tumours, but are not accompanied by swelling, such as tubercle, certain forms of diffused cancerous growths, and some others.

The diseases called Encysted Tumours are entirely different from all others of the class in their pathological characters. [WEN.] The chief cancerous growths have been already noticed under their appropriate heading [CANCER]; and tuberculous growths under the name of the disease which is consequent on their development. [PHTHISIS.]

All morbid parasitic growths may be divided into *malignant* and *innocent*. The practical distinction between the two classes, from which they derive their names, is that an innocent growth or tumour is not likely to recur after being removed by operation; but a malignant growth is likely to recur in the same or some other part. Independently of the practical distinction, the most essential characters of malignant growths are—1, that they may occur in almost any part of the body, although some parts are more liable than others, and each kind of growth seems to find its most appropriate seat in a certain organ, as cancer in the breast, tubercle in the lungs, melanosis in the liver, &c.; 2, that they have a tendency to infect the adjacent parts, and to propagate themselves from one part to another, probably by germs carried from the primary disease into the blood, with which they circulate till they meet with an organ in a fit state to supply them with the means of increase; 3, that they tend, through an intermediate process of softening (which appears to be consequent on the death of their constituent particles), towards ulceration; that this ulceration is of a kind which is at present incurable; and that in its progress it involves, almost without distinction of tissue, all the adjacent natural structures of the body, the particles of which, by their contact or combination with those of the malignant growth, seem first to assume a nature similar to their nature, and then to perish with them; 4, that in general the minute structures of which they are composed are dissimilar to those of the natural organs of the body; and that their development does not proceed to the formation of any structure similar to the fully-developed tissues.

The distinctive characters of innocent growths are chiefly negative. They include most of those to which the name of Sarcoma is now commonly given. Their appearances are so various, that the most practised morbid anatomists frequently meet with examples which they cannot certainly refer to any described variety. They may be distributed into the kinds of Fatty Tumour, Cellular Tumour, Fibrous Tumour, Cartilaginous Tumour, and Osseous Tumour. There is no remedy for these tumours but their removal. Not one of the medicines proposed for exciting their absorption is worthy of a trial. Of the means of removing them (when removal is possible), none is so safe, so expeditious, or productive of so little pain or inconvenience, as the knife; and whenever it can be employed, the sooner it is used the better; for, in general, delay can only increase the severity of the operation. For the operation itself, the only general rule is, that the whole of the diseased mass must be removed; any portion which is left will most probably become the nucleus of a similar growth. The particular proceedings must be

varied according to the size, locality, and other circumstances of the tumour.

TU'MULUS (or *Barrow*), a Latin word, signifying a 'little hill.' Tumuli, or artificial mounds of earth, of various sizes and forms, are found in many parts of the globe, and are commonly supposed to be tombs, or sepulchral memorials of persons of distinction, or of warriors slain in battle.

The first careful investigations into the tumuli of this country were made by Dr. Stukeley in the neighbourhood of Stonehenge above a century ago. In the densely-peopled districts barrows have mostly disappeared; but in the counties of Wilts and Dorset, and parts of Hampshire, they are scattered over the open downs, and crown the more elevated ranges of hills which are yet untouched by the plough. Sir Richard C. Hoare, in his 'Ancient Wiltshire,' classifies the different varieties of tumuli as the 'long barrow,' 'the bell,' 'the cone,' &c., terms which sufficiently explain their principal peculiarities of form.

The remains found in the Wiltshire barrows indicate three distinct stages or æras of society. The first was before the introduction of metals, when arms and implements consisted of spear-heads of flint, and arrow-heads of flint or bone; the second, when these articles were of brass; and the latest, when iron instruments, arms, and utensils accompany the deposit. Of the sepulchral urn, of which a great number have been found in the tumuli, there are two varieties, indicating different periods of mechanical art. Possibly the first of these may belong to the earliest known inhabitants of Britain; and the others may perhaps be assigned to the latest Belgic colonists.

TUN. [Ton.]

TUNBRIDGE. [Kent.]

TUNBRIDGE WELLS. [Kent.]

TUNE, in Music, a short *Air*, or *Melody*, with both or either of which terms it is synonymous.

TUNGSTEN, a metal first obtained in a perfect state by M. d'Elhuyart, in 1781. The name is formed of the Swedish words *tung sten*, 'heavy stone.' It has a grayish-white colour and considerable lustre. It is brittle, and nearly as hard as steel. Its specific gravity is 17.4, and with the exception of platina, gold, and iridium, is the heaviest known metal. It requires a very high temperature for fusion. It is not altered by exposure to the air. When heated to redness in the open air it takes fire, combines with oxygen, and is converted into tungstic acid, and nitric acid produces the same effect upon it.

The chief minerals which contain tungsten are *Tungstic Acid*, or *Scheelic Acid*; *Tungstate of Lime*; *Wolfram*, or *Tungstate of Iron and Magnesia*; and *Tungstate of Lead*.

Tungsten combines with several of the simple substances. *Tungsten* and *Oxygen* form an oxide ($T^1 O^2$), which is black and insoluble; when heated to redness it suddenly ignites and is converted into tungstic acid, by absorbing oxygen during combustion. *Tungstic Acid* ($T^1 O^3$) is pulverulent, of a yellow colour, insoluble in water, but readily dissolved by the caustic alkalies, forming with them salts called *Tungstates*. *Chlorine* and *Tungsten* form two compounds; of which the principal is the *bi-chloride* ($T^1 Chl^2$), which has sometimes the form of delicate red needles, but more commonly that of a deep red fused mass resembling cinnabar in fracture. *Sulphur* and *Tungsten* form a sulphuret, or perhaps two compounds; they are however but imperfectly known.

The tungstates of ammonia, potash, and soda, are all soluble and crystallisable compounds; while those of lime, barytes, and strontia are insoluble.

TUNICATA, *Les Acéphales sans Coquilles* of Cuvier, thus characterised by Cuvier:—Their branchiæ assume different forms, but are never divided into four leaflets. The shell is represented by a cartilaginous substance, sometimes so thin as to be flexible like a membrane.

Cuvier divides them into two families, the first, *Les Biphores*, comprehending the genera of which the individuals are isolated and without organic connection one with another, although they often live aggregated. Genera—*Thalia*, Brown; *Salpa* and *Dagysa*, Gm.; *Ascidia*, Linn.

The second family, *Les Aggrégés*, comprehends animals more or less analogous to the *Ascidians*, but united in a common mass, so that they appear to communicate organically together, and under this character would seem to link the mollusks to the zoophytes; but what, independently of their peculiar organisation opposes his idea is, as MM. Audouin and Milne Edwards have observed, that the individuals live and swim at first separate, and only coalesce at a certain epoch of their life. Their branchiæ form, as in the Ascidians, a large sac, which the aliments must traverse; the principal nervous ganglion also is between the mouth and the intestinal termination, and the disposition of the viscera is nearly similar. Genera, *Botryllus*, *Pyrosoma*. The following genera are fixed upon other bodies—*Polyclinum*, *Aplidium*, *Didemmum*, *Diazona*, *Chelyosoma*, &c.

[Ascidia; Boltenia; Botryllus; Bipapillaria; Synoicum; Cynthia; Cystengia; Dendrodoa.]

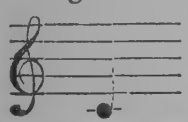
To the *Tunicata* is supposed to be allied that singular fossil form, *Ischadites Königii*, from the lower Ludlow Rock, described and figured in Mr. Murchison's 'Silurian System.'

For an extended account of the *Tunicata*, see MacLeay in 'Linn. Trans., xiv.;' MM. Audouin and Milne Edwards in 'Ann. des Sciences Nat.,' 1828, tome xv.; and a paper by the latter, entitled 'Observations sur les Ascidies composées des Côtes de la Manche,' read, 1839, before the French Academy of Sciences.

TUNING, the art of adjusting the several sounds of a musical instrument so as to make its scale approach to correctness; also that of putting two instruments, each of which has the parts of its scale in proper relative adjustment, into agreement with each other.

Some musical instruments have a permanent relative scale, all the parts of which, if changed at all, change together. Thus a horn or a flute may change its pitch from the heat of a room, but all the parts change together, and the whole effect of temperature is corrected at once by lengthening

the pipe of which the instrument consists. Other instruments require to have the parts of their scales compared with each other from time to time, owing to their several parts being unconnected, and subject to unequal wear or to separate accident: such as the organ and piano-forte. Others again are so liable to these derangements as to require tuning on every occasion of use, as the violin class, the harp, drums, &c.

A *perfect scale* is impossible; that is to say, one in which all the intervals, or even all the principal intervals, in every key, shall be perfect. Let additional notes be introduced to make existing keys perfect, and those additional notes would themselves become the key-notes of new keys, requiring additional notes to make *them* perfect. Again, the conditions of the ordinary musical instruments require that the octave shall consist of only twelve semitones, and though some organs have been constructed with more, it is not worth while to embarrass the subject by treating of any other scale than that of the twelve semitones. We shall use the same notation as in the article SCALE, expressing the following note of the treble scale,

by C, we shall denote the successive Cs in ascent by C^1, C^2, &c., and those in descent by C_1, C_2, &c.: thus C_3 is three octaves below C, and C^4 is four octaves above it.

The first point is to fix upon some one note, by the pitch of which all others may be determined. The only way of retaining a permanent pitch for use is by having an instrument which time will not alter. A standard pitch is usually obtained, or professed to be obtained, by the tuning-fork, an instrument consisting of two steel prongs growing out of a steel handle. When these prongs are sharply struck they vibrate, and if the instrument be then held to the ear, or placed upon the flap of a table, or any other sound-board, a low and very pure sound is heard, if the prongs be perfectly equal. These tuning-forks are usually made to sound either C^1 or A, and they would answer their purpose exceeding well if there really were in existence any standard from which they were made. But there is not; and the consequence is, that not only do the tuning-forks of different makers frequently vary a little from each other, but the new forks are sensibly higher than the old ones.

The leading note being settled, the tuner must learn to tune that note in perfect unison with his fork, and then to tune the octaves of that note both above and below. This seems to be the most plain and straightforward part of the whole operation: nevertheless, easily as tuners take it, and readily as they refer to one of their octaves, as being as good an authority as the original note itself, we cannot help thinking that more pains than is usually taken might be well bestowed. A note and its octave, when the consonance is perfectly well tuned, should sound like one note: now considering that in a grand piano there are six strings to be tuned before an octave is ready, three unisons with the lower note and three with the upper, it is not so very easy to present that perfectly indivisible effect which a good artist ought to strive for. There is a method (given in Jousse's works) of tuning the twelve semitones of one octave-interval first, without tuning the octave of any note, by proceeding upwards by fifths and downwards by fourths, until the whole is completed, and this purposely to avoid depending upon notes in the adjacent octaves. This mode however, or any other, must be matter of individual selection: it cannot be supposed that any one method would be best suited to all ears.

Those who are acquainted with the mathematical theory of the scale know that all the concords cannot be made perfect: others may learn it in the following way. Suppose twelve perfect fifths to be tuned upwards from C, and give the results the names of the notes which they would represent in the scale of twelve semitones, and in the nomenclature of sharps, if the scale were perfect. We should then have

$$C,\ G,\ D^1,\ A^1,\ E^2,\ B^2,\ F^3\sharp,\ C^4\sharp,\ G^4\sharp,\ D^5\sharp,\ A^5\sharp,\ E^6\sharp,\ B^6\sharp.$$

Now since $B^6\sharp$ is the same note as C^7, it appears that twelve perfect fifths should be the same as seven octaves; and if we pass to the octave below, as soon as we get out of the octave beginning with C, we should have C, G, D, A, E, &c., the last being C^1. It will be found however that this is not true, but that the note obtained from twelve ascents by fifths intermixed with six descents by octaves is sharper than C^1. Again, if the perfect thirds be tuned from C, we should have C, E, $G\sharp$, C^1, but it will be found that C^1 obtained in this way is too flat. The octave derived from the fifths vibrates 223 times where it should vibrate 220; and that derived from the thirds vibrates 125 times where it should vibrate 128. The slight alterations which are made in order that any one of the twelve notes of the octave may be fit to be used as a key-note, without any shock to the ear, constitute the *temperament* of a scale; the altered consonances are said to be *tempered*. Some writers call the interval from the false octave obtained by the fifths to the true one, by the name of the *wolf*.

Two systems of temperament suggest themselves: the first, *equal*, in which the necessary defects of the scale are distributed equally throughout it; the second, *unequal*, in which some mode is adopted of distributing the imperfection so as to make some keys feel it less than others. The most common practice of our day is to endeavour at equal temperament. The two systems have their advocates, and the arguments for one and the other are as follows. In favour of equal temperament it is urged that all the keys are made equally good, and that in no one does the imperfection amount to a striking defect: also that in the orchestra there is little chance of any uniform temperament among the various instruments, if it be not this one. Against equal temperament it is urged that it takes away all distinctive character from the different keys, and leaves no one single key perfect. All these arguments have force, both for and against: for ourselves, we consider those

against equal temperament much the stronger. We have often felt that a pianoforte newly tuned has, with much correctness, a certain insipidity, which wears off as the effect of the tuning gradually disappears; insomuch that the best phase of the instrument, to our ears, is exhibited during the period which precedes its becoming offensively out of tune. At this time the progress towards the state of being out of tune (for which there is no single word, *maltonation* would do very well) can only be called a change of the temperament; and the several keys begin to exhibit varieties of character which, until maltonation arrives, render the instrument more and more agreeable. But it must be remarked with respect to equal temperament, that it cannot be obtained in the ordinary way of tuning. The only way of obtaining a given temperament, equal or unequal, with certainty, is to take a monochord, and having calculated the proper lengths of the different strings, to form the successive notes on the monochord, and to tune the several notes of the instrument in unison with them. No tuner can get an equal temperament by trial: so that the question lies between the having all sorts of approximations to equal temperament, according to the propensities of different ears, or as many sorts of approximations to some other systems.

The mode of proceeding by approximation to equal temperament is simply to tune the fifths a little too flat, and the following order of proceeding is the most usual, and has often been given. The first letter represents the note already tuned, the second the one which is to be tuned from it: a chord interposed in parentheses represents the trial that should be made upon notes already in tune, in order to test the success of the operation as far as it has gone. The first step is to put c^1 in tune by the tuning-fork:—

C^1; C^1C; CG; GG_1; G_1D; DA; AA_1; A_1E; (CEG); EB; (CEG, DGB); BB_1; $B_1F\sharp$; (DF♯A); $F\sharp F_1\sharp$; $F_1\sharp C\sharp$; ($A_1C\sharp E$); $C\sharp G\sharp$; (EG♯B); C^1F; (FAC^1); $FA_1\sharp$; ($A_1\sharp DF$); $A_1\sharp A\sharp$; $A\sharp D\sharp$; (D♯GA♯); $D\sharp G_1\sharp$; ($G_1\sharp CD\sharp$).

We have written all the semitones as sharps, whether tuned from above or from below. Of course, since the fifths are all to be a little too small in their intervals, the upper note must be flattened when tuned from below, and the lower note sharpened when tuned from above. In the preceding the octave CC^1 is completely tuned, and also the adjacent interval $F_1\sharp C$. The rest of the instrument is then to be tuned by octaves. The thirds should all come out a little sharper than perfect, as the several trials are made: when this does not happen, some of the preceding fifths are not equal. The parts which are first tuned by the fifths, and from which all the others are tuned by octaves, are called *bearings*.

TUNIS, one of the Barbary states or regencies, situated in the central part of the northern coast of Africa. It is bounded on the N. and E. by the Mediterranean Sea, on the W. by the territory of Constantina, and on the S. by the Beled-el-Jerid, or the 'country of palm-trees.' Its greatest extent from N. to S., where the boundary-line is very undefined, is about 300 miles, while its breadth from W. to E. varies from 65 to 140 miles. The area is about 30,000 square miles. It is the most important of all the countries of northern Africa, not only on account of its position, but for the ports it possesses on a coast measuring in a sailing line about 400 miles.

Surface, Soils, and Climate.—The northern portion of the country, or that which is situated north of 36° N. lat., exhibits in general a hilly character, and rises in some parts into mountains of considerable elevation, though there are also several plains of some extent. In the southern districts however, which comprehend more than three-fourths of the area, a level character prevails, and such ridges as occur are neither extensive nor elevated, with the exception of the Jebel Ussalat. The northern coast, from the boundary-line of Tunis and Algiers to Ras Sidi Ali-el-Mekki, or Cape Farina, is rocky and high. The coast of the Bay of Tunis, from Ras Sidi Ali-el-Mekki to Ras Ghamart, is low and generally swampy. Crossing Zembræ, we find ourselves at Cape Bon (Ras Addar), the Promontorium Mercurii of the ancients. This cape forms the eastern extremity of the gulf. From Ras Mustapha to Ras-el-Mahmoor the coast is low and generally swampy. A tract of low and rocky coast extends from Ras-el-Mahmoor to Hammamet, and it is followed by a low sandy coast, which occupies the interior of the Bay of Hammamet, and terminates near Susa. Passing the modern town of Mistir, or Monastir, which is walled in and fortified, we arrive at Cape Demas, the southern limit of the Gulf of Hammamet. Mahadeah, called Turris Hannibalis by the ancients, stands on a point of land about nine miles to the southward of Cape Demas. About 21 miles farther to the south opens the Gulf of Cabes, or the Little Syrtis, the shores of which are very little above the sea-level; and in general sandy rocks or cliffs of small extent are only found in a few places. The gulf is not more than 75 miles in extent from its northern to its southern point, and it penetrates into the mainland about 60 miles.

The north-western portion of Tunis, or that which is enclosed by the boundary-line of Algiers on the west, the valley of the Majerdah River on the south and east, and the Mediterranean on the north, is very mountainous. It contains the ranges of the Frigean and Mogody Mountains, many of which rise to a height of 5000 feet, and the slopes of which are generally fertile. Near the Mogody range is Lake Benzart, which is 28 miles long by 14 broad, and is connected with the sea by a channel 10 miles long. The river Majerdah rises within the territories of Algiers, where it is formed by the junction of the waters of the Wady Serrat and the Wady Khamees; the river runs for the most part through a shallow basin of moderate fertility. An uninterrupted tract of elevated ground traverses the country in a diagonal line between 35° and 37° N. lat., beginning on the south-west on the boundary-line of Algiers, and terminating on the north-east in the peninsula of Dakhul and Ras Addar; it has several high summits, covered with forests. Between this high

ground and the river Majerdah, lies the plain of Tunis, which extends 20 miles on the north and west side of the town, but to double that distance towards the south; it has a few ranges of hills, and has a poor but well-cultivated soil. The Dakhul, or the peninsula which lies east of the Bay of Tunis, is nearly occupied by a mountain range which extends from Jebel Zaghwan to Ras Addar. In this range occur two deep depressions of inconsiderable width, through which roads are carried. A narrow level tract on the east side of the Dakhul is noted for its fertility.

The countries hitherto noticed may be considered as the agricultural part of Tunis. The greater part of the inhabitants are exclusively or chiefly engaged in cultivating the ground and in planting olive-trees and orchards. In some parts these occupations are united with the rearing of cattle and attending to the dairy.

The region which is separated on the north from the upper valley of the Majerdah by the Al Kaff Mountains, consists of an alternation of hills and of plains of considerable extent. To the east of this region lies the plain of Kerwan. Nearly in the middle of this plain, which is more than 100 miles in length and about 30 miles in width, the town is situated from which its name is derived. The plain is separated from the sea by hilly tracts, which extend from the town of Susa southward to a point opposite the islands of Karkenah. This tract may be about 24 miles in width in the widest part, and contains a few spots of great fertility. The country which lies to the south of the three last-mentioned regions, and which contains the larger part of the country called by the ancients Byzacium, once noted for its fertility, is at present almost a desert, of which very little is known to Europeans. The southern portion of Tunis is called the Jerid, or Beled-el-Jerid (the country of palm-trees). It extends from about 34° N. lat., southward to the parallel of the southern extremity of the great salt lake Al Sibhah, and on the south is contiguous to the Sahara. This lake is 70 miles long from south-west to north-east, and about 26 miles wide on an average. The country which extends from the eastern shores of the salt lake to the Gulf of Gabs consists of a succession of hills. It contains a great number of springs and small watercourses, to which circumstance its fertility is owing: fruits and garden vegetables are here cultivated in great abundance. Near the boundary-line of Tripoli is the island of Gerba, about 18 miles long by 9 wide; it has four small ports or landing places, a fertile soil, and a dense population.

The atmosphere of Tunis is generally pure and wholesome. The plague is not endemic or periodical, as in Egypt, and is only known when introduced from other parts. In all other respects the climate and seasons resemble those of Tripoli. The summer heats are moderated by sea-breezes along the coast, and the winters resemble our spring. During the summer and autumn rain is very rare: it usually falls in November, and continues at intervals until the month of April.

Government.—The ruler of the territory of Tunis bears the title of Bey. He is tributary to the Sultan, who however has little control over him, and he is an independent prince, and the sovereign of the country, with whom the states of Europe enter into treaties on matters international and commercial. His power is despotic; for the divan is only formally assembled to confirm the will of its master. This kingdom is not divided, like Tripoli, into provinces governed by separate chiefs, but it is under the direct control of the Bey himself, whose power is consequently the more consolidated, and no one ever thinks of opposing it. The Bey is the chief of the religion of the state in Tunis, and is himself the first judge in his kingdom. He sits in the hall of justice almost daily, and his decisions, which are summary, are immediately put into execution. The naïbs administer justice in the same manner in the interior towns. The kadis judge only in matters of religion.

Commerce.—The foreign commerce of Tunis is the most considerable of all the Barbary states. It is not confined to the capital, but is also carried on briskly from the ports of the eastern coast. Among the manufactured articles of export are—soap, marocco leather, shawls, and red scull-caps. Wheat and barley, as well as the inferior grains, olive-oil, wool, hides, bees'-wax, dates, and almonds, are the principal articles of produce exported. Those received from the interior of Africa, and afterwards exported, are—ivory, gold-dust, ostrich-feathers, senna, and madder-roots. The imports are woollen cloths, cotton-prints, calicoes, muslins, coarse linens, damasks, raw and wrought silks, fine wool, gold and silver tissues, coffee, sugar, spices, iron, tin, lead, hardware, cutlery, arms of all sorts, earthenware, paper, wine, spirits, and tobacco. As ports of loading, those of Sfax and Susa are preferred to Tunis, in consequence of the distance and delay of transporting merchandise in lighters across the lake to the Goletta, where ships generally lie; the commerce of the country is consequently best carried on in vessels under 150 tons burden. The trade with central Africa passes through Gadamis. The caravans arrive at Tozer, Cabes, and Sfax about twice in the year, and barter their merchandise, which is thence introduced in various directions into Tunis.

Towns.—The territory of Tunis contains a great number of ancient towns, whose ruins lie scattered over the whole country, and now stand in the midst of these vast solitudes, some of them totally uninhabited, except by the lion, the wolf, and other ferocious animals, unless when the Arabs occasionally pitch their tents on their sites.

The next city in rank and importance after Tunis is *Cairoan*, or *Kairwan*, which has good houses, and is surrounded by a wall. The great mosque, which is esteemed the most sacred, as well as the most magnificent in all Barbary, is supported by many marble or granite pillars, said to amount to 500; but no Christian has ever been allowed to see them. *Kaff* is the third city in riches and strength, and is the key of Tunis on the western frontier; its walls are kept in good repair, and the fortress mounts about 130 pieces of cannon.

The towns and villages are more numerous and the population is greater in the northern parts of the regency near the capital. The Dakhul, besides being an agricultural district, abounds in game, is the seat of a large fishery, and has several small rivers running into the sea, which fertilise the country. Proceeding in this direction from the capital, we first arrive at the considerable village of *Rhades*, and then at *Solyman*, which has a large population, the descendants of Moors who fled from Spain. At *Hamman Leuf*, where the Bey has a palace, and at *Hamman Ghorbus*, are mineral-baths famous for curing rheumatic, cutaneous, and syphilitic disorders. Beyond these is *Lowhareah*, where there are extensive marble-quarries, which are said to have furnished the materials for the building of Carthage and Utica. *Zowan*, or *Zagwan*, a flourishing town built upon the skirts of a very high mountain of the same name. *Carthage* has no modern population, although only twelve miles distant from Tunis; and on the site of *Utica* there are only a few miserable huts, known by the name of Booshater, standing almost in a marsh.

The lion, the panther, the ounce, the lynx, the wolf, and the wild boar, are the principal ferocious animals that inhabit the western parts of Tunis; for to the eastward of the meridian of Tabarca the forests cease, and the country is less woody. Flies, noxious vermin, mosquitoes, gnats, ants, and the scorpion, are the torment of Europeans in all parts of the country.

Inhabitants.—The Tunisines in general, like the Algerines, are a mixed race of Turks, Moors, and Jews, in the towns, interspersed with a few Christians and renegades; while the people of the country are Arabs and Kabyles of different tribes. The houses of the rich Moors, although of ordinary appearance without, are handsomely decorated within; their furniture consists of few articles, such as carpets, mattresses, and cushions, which are often made of rich silks and embroidery. The Beduin Arabs, who are the inhabitants of the level country, are perpetually wandering from place to place. The Kabyles live in the mountains, and form little villages of hovels made of hurdles and mud, or of clay and stones hardened by the heat of the sun.

The number of inhabitants of the state of Tunis is supposed to amount to about 1,500,000; amongst whom there may be 7000 Turks, about 9000 Christians (principally Roman Catholics and Greeks), and perhaps 100,000 Jews.

Antiquities.—The ancient sites on the banks of the Majerdah abound in ruins, particularly at Dukhah (the ancient Thugga), consisting of temples, an arch, a number of cisterns, baths, barracks, gates, theatres, an aqueduct, and many inscriptions. At Ayedrah is a handsome triumphal arch dedicated to the Emperor Septimius Severus, and columns of various beautiful marbles. At Kaff (Sicca), which, like Ayedrah, is on the western frontier, is still to be seen a paved street like those of Pompeii, and here likewise capitals, columns, and friezes are numerous. But the most stupendous monument of ancient times is on the site of Tysdrus, now called El Jem. Here rises an amphitheatre, which Shaw refers to the reign of the Gordians. This is one of the most perfect, vast, and beautiful remains of former times that is known to exist. Its extreme length measures 429 feet and its breadth 368; and it is only surpassed in magnitude by those of Rome and Verona. It is nearly in a complete state of preservation, with its seats, arena, and vomitories, and retains almost the freshness of a modern erection. The great aqueduct which conveyed water to Carthage, 52 miles in length, may yet be traced by masses of stone and cement. In 1837, on the site of Carthage, was discovered a Roman villa near the sea-shore, buried fifteen feet under ground. Eight large rooms were completely cleared. The walls were painted, and the floors were beautifully paved in mosaic. In another house still more beautiful mosaics were found, representing gladiators contending with wild beasts, horse-races, and men breaking-in young horses.

History.—Tunis is a place of great antiquity. In A.D. 439 it fell into the hands of the Vandals; but in 533 was rescued from them by Belisarius. It continued to be subject to the Greek emperors until the irresistible arms of the caliphs overran northern Africa, towards the end of the seventh century, when the conqueror Okbah, or Akbah, with a view to secure the country for them, founded the city of Cairoan, or Kairwan. The country around Tunis was governed by Arabian viceroys for some centuries. In 1206 Abu-Ferez established an independent state, with the city of Tunis as its capital. Kings of this race reigned till 1532, when Tunis fell into the hands of the Turks.

Upon its conquest by the Turks, Tunis was governed by a Turkish pasha and a divan, or council of military men, with a body of janissaries sent from Constantinople; but their rapacity soon disgusted the Moors, and they obtained permission to elect a dey from amongst themselves, as at Algiers. Of twenty-three deys who reigned, all were strangled or otherwise assassinated, with the exception of five. During these tumultuous times, the beys, who were the second officers of the state, gained the influence, and eventually the succession, while the divan dwindled into a mere shadow of power. Meantime the Tunisine corsairs continued to infest the Mediterranean. At length, in 1816, in consequence of an agreement between the European powers, Tunis renounced for ever Christian slavery, under the threat of that punishment which Lord Exmouth with a naval force inflicted upon Algiers.

TUNIS, a large and flourishing city and port, the capital of the regency of the same name, situated on the coast of Barbary. The city is encircled by a high wall with six gates, around which is another wall encompassing the suburbs, having eleven gates or passes into the country, and measuring about five miles in circumference. The town contains about 12,000 houses, and from 150,000 to 200,000 inhabitants. No place enjoys by nature a greater plenty of the necessaries of life. But the streets are narrow, irregular, and filthy in the extreme, becoming after a few hour's rain a perfect marsh, and in summer still more

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intolerable from their dust, rubbish, and vermin, and from the effluvia of the open drains. There are five principal and many smaller mosques, into which no Christian is permitted to enter. The houses in general are only one story high, with a court in the centre, and usually without windows to the street. In the middle of the city is an open space of no great extent, surrounded by shops for the sale of manufactures. The Bey's town palace is a modern building, but in the Saracenic style; and, although situated in a narrow street, is a handsome edifice, with marble courts and galleries. There are extensive barracks, a theatre, and a few other public buildings.

The chief manufactures of this city are linen and woollen cloths and embroidery. The town presents considerable bustle. From sunrise to sunset, when the Moors retire to rest, the streets are filled with people.

Besides the mosques of the Mohammedans, the Jews have their synagogues, and the Greeks and Roman Catholics have several places of worship.

TUNNEL, in civil engineering, an arched passage formed underground to conduct a canal or road on a lower level than the natural surface. Long tunnels are usually made through hills in order to avoid the inconvenience and loss of power occasioned by conducting a canal, road, or railway over elevated ground, and also the enormous expense of such an open excavation as would be necessary in order to preserve the requisite level. Those of less extent are frequently constructed to avoid the opposition of landowners, or to afford uninterrupted passage under a road, canal, or river.

Rocky strata, if the stone be of a nature to work freely, are usually the cheapest for tunnelling, owing to the absence of lining, and the power of saving labour by the use of gunpowder. Tunnelling in clay is frequently attended with formidable difficulties which render it very expensive. It is, when tough, a difficult material to remove, blasting being of no use, and spades and pickaxes being almost inapplicable. In such cases hatchets may be used to advantage, but cross-cut saws answer best. Tunnels formed through chalk are often impeded by faults or cavities filled with wet gravel or sand, which pour a flood of semifluid matter into the excavation as soon as they are cut into. The irruption of such loose materials, as well as of water alone, has in many cases occasioned difficulties almost insurmountable. Loose sand is perhaps the most difficult stratum that can be met with in tunnelling, but it has been in several instances successfully passed through.

Short tunnels are occasionally excavated from the ends only, but those of considerable length are usually formed by sinking vertical shafts, about nine feet in diameter, down to the level of the tunnel, and excavating in each direction from the bottom of each shaft, until the several parties of workmen meet in the intermediate portions. By this means the work can proceed at any required number of points or faces, so as to bring the execution of the tunnel, whatever may be its length, within a moderate period of time. The number of working shafts in a given length of tunnel is determined by the nature of the ground and the time allowed for excavation. Besides the working-shafts there are usually small air-shafts of three or four feet diameter to prevent the accumulation of foul air in the workings of the tunnel. In very long tunnels one or more large shafts are desirable for the purpose of ventilation, and also to admit some degree of light. When a complete brick lining is required, the bottom is the part first built, and it is completed by a course of stone laid along each side, at the point where the side walls spring from it

The Thames Tunnel.—Many projects have been started for making a tunnel under the Thames; but the only one put into successful operation is that for which an act was obtained in 1824, with Mr. Brunel as the engineer. Operations were commenced early in 1825 by the construction of a shaft 50 feet in diameter, at a distance of 150 feet from the south side of the river, at a point about two miles below London Bridge. A similar shaft was sunk on the north side of the river. The excavation for the tunnel was an oblong square, 38 feet wide and 22 feet 6 inches high, presenting a sectional area of 855 square feet. The shield by which the excavation was effected consisted of twelve massive frames of iron, placed side by side, and capable of being slid forward for a short distance independently of each other. The whole apparatus may be compared to a massive cofferdam laid on its side, and capable of being moved forward by the action of screws abutting against the end of the completed brickwork, which followed it up closely. Each frame of the shield consisted of three stories, each of which formed a cell large enough for one man to work in conveniently. The arrangements for supporting the wet clay of the Thames bed while the brickwork was being prepared, were of a very ingenious description.

The excavation of the tunnel was commenced in January, 1826, in a stratum of clay; but several irruptions of the river took place; one, in 1828, was so serious in its consequences that the Company did not resume operations till 1835. The tunnel is 1200 feet in length between the two shafts on the opposite banks of the river. It was not until 1843 that the Thames Tunnel was opened for foot passengers.

TUNSTALL. [STAFFORDSHIRE.]

TUNSTALL, JAMES, was born about 1710, and educated at St. John's College, Cambridge, of which he afterwards became a fellow and tutor. In 1739 he obtained the rectory of Sturmer in Essex, and two years later he was appointed chaplain to Potter, archbishop of Canterbury. In 1744 the university of Cambridge conferred upon him the degree of D.D. He afterwards received from the archbishop the rectory of Great Chart in Kent, and the vicarage of Minster in the Isle of Thanet; but he resigned both places in 1757 for the vicarage of Rochdale in Lancashire. He died March 28, 1772.

Dr. Tunstall's 'Epistola ad Virum eruditum C. Middleton,' Cambridge, 1741, 8vo., and his 'Observations on the present Collection of

Epistles between Cicero and Brutus,' have caused all the subsequent editors of Cicero to question the authenticity of these epistles. The other works of Dr. Tunstall are of a theological or theologico-political character.

TUPAIA, Sir T. Stamford Raffles's name for a genus of mammals which Dr. Horsfield places among Cuvier's *Insectivorous Carnassiers*, the *Ferœ* of Linnæus, and the *Falculata* of Illiger.

Generic Character.—Head oblong, depressed. Snout long, equally attenuated; nostrils lateral, semilunar. Eyes very large and rather prominent. Ears large and oblong. Body cylindrical, covered with close fur and soft hairs. Tail longer than the body, linear, compressed. Feet plantigrade and pentadactyle, soles naked, claws falcular.

Dr. Horsfield ('Zoological Researches in Java') states that in the Malayan language the name of *Tupai* is a general term for various small animals which have the external form and agility of the squirrel; while each different species, agreeably to the observations of the natives of the islands of the Eastern Archipelago, where these animals are found, is distinguished by a particular epithet.

Five species are already known: three from the Indian Islands; one from Pegu in the southern part of Birma; and another from the eastern Ghauts. This is the *Tupaia Ellioti*, Waterh. ('Proceeds. Zool. Soc.,' 1849, p. 106.)

Food and Habits.—Arboreal, feeding on fruits and insects. Sir Stamford Raffles states that a tame *Tupaia ferruginea* was suffered to go about at perfect liberty, ranged in freedom over the whole house, and never failed to present himself on the breakfast and dinner table, where he partook of fruit and milk. Dr. Horsfield also quotes an extract from the 'Proceedings of the Asiatic Society,' where it is stated that a living *Tupaia ferruginea* was brought to Bengal by a medical gentleman; it ran about the house tame, but would not allow itself to be caught for close inspection. Though at liberty to run out of doors whenever it liked, it showed no disposition to leave its quarters, and evinced some attachment to the family; for whenever strangers entered the house, it showed disquietude and made a chattering noise. It gave no trouble in feeding, for it was always on the search after insects, and its favourite food seemed to be flies, crickets, grasshoppers, and cockroaches.

TUPISTRA, a genus of plants nearly allied to the natural family of *Smilaceæ*. The genus is little known, but has sometimes been cultivated in our hothouses.

TURBI'NIDÆ, a family of gastropodous Mollusks belonging to the *Pectinibranchiata* of Cuvier. This zoologist, in his 'Règne Animal,' divides the *Pectinibranchiata* into the following sections, or, as he calls them, families—*Les Trochoides, Les Capuloides, Les Buccinoides*. He divides *Les Trochoides* into *Les Toupies, Les Sabots* (*Turbo*, Linn.), and several other minor groups.

Les Sabots comprehends the genus *Turbo*, as at present restricted, the genera *Meleagris* (Montf.), *Delphinula, Pleurotomarium* (fossil), of which he considers the *Scissurellæ* of M. d'Orbigny to be the living representatives, *Turritella, Scalaria*, and the terrestrial and freshwater genera *Cyclostoma* and *Valvata*. Cuvier thus makes the *Sabots* to comprehend all the species which have the shell completely and regularly turbinated with a mouth entirely round.

He observes of the group *Les Sabots* M. de Blainville makes his family of *Cricostomata*. We may here add that this family, according to De Blainville, consists of the genera *Turbo, Pleurotomarium, Delphinula, Turritella, Proto, Scalaria, Vermetus, Siliquaria, Valvata, Cyclostoma*, and *Paludina*. He adds that this family is really hardly distinct from his family of *Goniostomata*, the two fusing together by insensible gradations.

Shell variable in general form, with an aperture always nearly circular, and closed by a calcareous or horny operculum; spiral whorls few; apex substantial.

Mr. Swainson divides the *Turbidæ* (*Turbinidæ*) into four subfamilies, to the first of which, comprehending the genus *Thallicera* of Quoy, he gives no name. The others stand as *Ampularinæ, Melanianæ*, and *Turbinæ*.

For the views of Mr. J. E. Gray we refer to the 'Synopsis' of the British Museum.

As examples of the family *Turbinidæ* we select the following genera:—

Gen. *Turbo*.—Examples.—*Turbo marmoratus*. This shell, deprived of its outer layer, exhibits a brilliant silvery nacre, and in this state is commonly sold as an ornament. *Turbo torquatus*, from King George's Sound. *Turbo Cookii*, from New Zealand, Tasman's Bay, &c.

Fossil species of *Turbo* are numerous.

Gen. *Monodonta*.—Examples.—*Monodonta Pharaonis*, fossil; *M. Ægyptiaca*, living.

Gen. *Littorina*.—Example.—*Littorina communis*. *Lit. pulchra*, has been found on mangrove trees fourteen feet above the water; has been kept alive six months without water.

Gen. *Phasianella*.—Example.—*Phasianella bulimoïdes*, from the coasts of Australia. *Phasianella* occurs as a fossil below the chalk.

Gen. *Tuba* (Lea).—Fossil, in tertiary formations, Claiborne, Alabama.

We proceed to the consideration of the genera *Nerita, Navicella*, and *Natica*, which, though they cannot be said to belong to the *Turbinidæ*, especially the last-named genus, which we shall find to be very peculiar, are yet so far analogous to the forms which compose that family, that they may as well find a place here.

The Nerits are marine or freshwater animals, a modification of habit which MM. Quoy and Gaimard think sufficient for establishing a simple division between these mollusks, which Lamarck erroneously in their opinion separated into two genera—*Nerita* and *Neritina*; for their organisation is entirely similar. Thus the *Neritæ*, with a comparatively thick shell, which is very rarely furnished with an epidermis, are always found in the sea; and the *Neritinæ* of Lamarck, whose shell is more delicate and almost constantly covered with an epidermis, are always inhabitants of fresh water. The Nerits pass a part of their life out of the water without ever removing to a distance

from it. Those which haunt streams or marshes may adhere to the leaves of trees, but without going on land.

MM. Quoy and Gaimard state that they were sometimes astonished to see these animals bear, upon the black rocks, all the action of an equatorial sun without appearing to be affected by it. They owe this faculty to providing, when they adhere, some drops of water which sufficiently refresh their branchiæ. This store, or what is left of it, they discharge when lifted from the rock.

The Nerits are very widely spread in warm climates. They are gregarious, and many species are found grouped on the same rock. Some love sheltered nooks, others are exposed to the fury of the waves: and among those which haunt fresh-waters, some live in the deeps in the midst of the strongest currents; others, on the contrary, keep themselves in the slime of marshes. In their sufficiently agile movements their lips are constantly observed in motion.

The animal has a large head, a little notched in front, with two rounded lobes on the sides. The aperture of the mouth, which is subjacent to this sort of hood, is wide and plicated. The tentacles are always very long, pointed, and soft, carrying the eyes at their base upon a pedicle. The foot is oval, narrowed, a little pointed behind, wide in front, with a marginal furrow, and sometimes a depression, which gives it the appearance of being slightly lobated.

Examples.—*Nerita polita*, *N. Ascensionis*, *Neritina frulligera*. *Nerita* is numerous in fossil species.

Gen. *Navicella*.—Example.—*Navicella elliptica*, fluviatile; from Indian Archipelago.

Gen. *Natica*.—Example.—*Natica melanostoma*, from the Moluccas, &c. This genus occurs in a fossil state in the old world, and in the tertiary of Alabama, and the cretaceous group of New Jersey.

We may here add that according to Mr. Gray the *Neritidæ* comprise the following genera:—*Nerita*, *Pileolus*, *Culana*, *Neritina*, *Clithon*, *Dostia*, *Velates*, and *Navicella*.

Under the *Naticidæ* he comprises the following genera:—*Natica*, *Neverita*, *Nacca*, *Cepatia*, *Polinices*, *Mammilla*, *Cernina*, *Globulus*, *Naticina*, *Cryptostoma*, *Stylina*? *Radula*?, and *Neritopsis*.

TURBOT. [Pleuronectidæ.]

TURDUS. [Thrushes.]

TURENNE, HENRI, VICOMTE DE, second son of Henri duc de Bouillon and of Elizabeth of Nassau, was born Sept. 11, 1611.

His father died in 1623; and jealousy of the designs of Cardinal Richelieu to the prejudice of the Huguenots induced his mother to send Turenne, in 1625, to Holland, to the charge of his uncle Prince Maurice. Three months afterwards Prince Maurice died, but his brother, Henry Frederic, was equally attentive to their young relative. In 1626 Turenne obtained a company of infantry, and served under his uncle till 1630, in the war at that time carried on in Holland.

In 1630 he was sent by his mother as a hostage to the French court, in order to avert the designs of Richelieu against the sovereignty of his brother the Duc de Bouillon, still a minor. Turenne, whose reputation for military science had preceded him, was, though only nineteen, appointed to the command of a regiment of infantry. The first opportunity he now had of distinguishing himself was at the siege of La Motte in 1634: his conduct on that occasion procured for him the appointment of maréchal-de-camp.

In 1635 the Cardinal de Richelieu sent four armies into the field to attack the Spaniards simultaneously on as many different points. Cardinal de la Valette was placed at the head of the forces destined to co-operate with the Swedes in Germany, and Turenne was attached to him as maréchal-de-camp. During the disastrous campaign that followed, Turenne sold his plate to procure provisions for the soldiers under his immediate command; and while discipline was almost entirely lost and the baggage thrown away by the rest of the army, he retained his troops in their accustomed order, and abandoned only so much of the baggage as enabled him to procure wagons for those who were unable to march. Turenne again attended La Valette in the campaign of 1636, on the Upper Rhine; and again in 1637 in Flanders. This was a campaign of sieges, and the conducting of them devolved almost exclusively upon Turenne, who closed the campaign by driving the Spaniards across the Sambre. In 1639, after some further service on the Upper Rhine, he was sent to Italy, second in command to the Comte d'Harcourt. In 1640 the French commander adopted the advice of Turenne in opposition to all the rest of his generals, and formed the siege of Turin, which surrendered Sept. 17. D'Harcourt then returned to France, leaving the army under the command of Turenne, who however was soon superseded in consequence of the political conduct of the Duc de Bouillon, whose quarrels with the French Court also caused Turenne to be deprived of the command of the army in Italy, to which he was appointed at the commencement of the regency. Turenne was now ordered to Germany, where, during the winter 1643–44 he succeeded, by raising money on his own credit, in re-equipping the army which had been raised by the Duke of Weimar, and restoring its discipline. With this army, so great was his power of conciliating the affections and keeping up the spirits of the soldiery, he struggled through five campaigns, and ultimately commenced the system of combined operations between the armies of France and Sweden, which led to the occupation of the Bavarian territory, and the Emperor's consent to the treaty of Münster.

When the disturbances broke out at Paris, at the commencement of 1649, Turenne rejected the overtures of Mazarin, but, finding that resistance would be vain, retired to Holland with some of his personal friends. A hollow truce was soon after arranged between the contending factions, and Turenne returned to France. When Condé was thrown into prison, Turenne proved faithful to him. He threw himself into Stenai, and prevented its being taken by the royal troops. He alone rallied the dispirited friends of Condé, procured the release of the prince, the exile of Mazarin, and the conclusion of a peace with Spain.

Turenne returned to Paris in May, 1651, and having as he said discharged his duty to Condé by procuring his release from prison, declared for the regent and Mazarin, and accepted in 1652 the command of the royal army. It was soon evident that the same mind which upheld the Prince of Condé's cause when he was imprisoned, now struggled to uphold the royal authority against as fearful odds. But his genius maintained its ascendant, and by the close of the year Condé was obliged to quit France: the king was crowned at Rheims, entered Paris, and consigned the Cardinal de Retz, the only remnant of the Fronde, to a dungeon.

From 1653 to the conclusion of 1659 Turenne's genius for war found ample scope in the campaigns in the French and Austrian Netherlands, which were concluded by the treaty of the Pyrenees.

The death of Mazarin in 1661, and the resolution of Louis XIV. to be thenceforth his own prime minister, though it did not raise Turenne to office, gave him a powerful influence in state affairs. The first sensible effect of his influence was the resolution of Louis to protect the independence of Portugal, which Mazarin had resolved to sacrifice to the Spaniards. Turenne's credit with De Witt was mainly instrumental in opening the negociations with Holland which led to the treaty of commerce concluded with that power. When, in 1665, England and Holland endeavoured to induce Louis XIV. to assist in the war against the other, it was by the advice of Turenne that the king tried to reconcile the belligerents.

Turenne had been educated by a moderate Calvinist, and, like most active men who seek not a religion of abstract opinions, but of practical influence, he cared little for doctrinal points. The death of his wife, the daughter of the Duc de la Force, in 1666, removed the last tie that bound him to the Protestants; and he was received into the bosom of the Roman Catholic church by the archbishop of Paris. His change of religion cannot be called a conversion in the high sense of the word: it was merely an additional step in the process of changing him into a thoroughly naturalised Frenchman.

Louis availed himself of the peace between England and Holland, in 1667, to form a combination against Spain, with a view to make himself master of the Spanish Netherlands. The campaign in Flanders was the consequence. The victories gained by Turenne from 1672 to 1675 serve only, so far as he is concerned, to place in a more brilliant light the qualities which he had amply displayed on former occasions. He fell near Sassbach, July 26, 1675, while preparing to lead his troops into action.

TURGOT, ANNE ROBERT JACQUES, was born in Paris, May 10, 1727. His father was Président aux Requêtes du Palais, and afterwards Prevôt des Marchands, councillor of state, and first president of the Great Council. Turgot was destined for the ecclesiastical profession, but he entertained some conscientious objections; he therefore studied the law, and became a Maître des Requêtes. In 1761 he was appointed intendant of Limoges, and during the thirteen years that the province was under his administration, the more equitable distribution of imposts, the making of roads, the militia, the providing of subsistence for the people, and the protection of commerce, were the principal objects of his labours.

On the death of Louis XV. a wider field was opened for Turgot's enlarged and beneficent policy. The state of France demanded a reforming minister; and the public voice called Turgot to the highest offices. He was at first minister of the marine; but after continuing only a month in this situation, he received the appointment of Contrôleur-Général, then equivalent to that of prime minister.

One of the first measures of Turgot was the establishment of a free trade in corn in the interior of the kingdom. He also passed a law abolishing the corvées (which consisted in the repair of the high-roads by the compulsory labour of the poor inhabitants of the district) throughout France, a law which was revoked immediately after Turgot's removal from office. Having by enactments of this kind nearly destroyed the servitude of the inhabitants of the rural districts, Turgot also abolished most of the restrictions and exclusive privileges under which the inhabitants of the towns suffered.

The characteristics of Turgot's financial administration were exactness in payments, fidelity to engagements, a reduction of expenditure whenever it could be effected without hardship and injustice. 'He had augmented the public revenue,' says Condorcet, 'without putting on a new impost, and after having suppressed or diminished several; and without having recourse to new loans, he had made repayments and diminished the debt. All these labours had been the work of twenty months; and two attacks of gout, an hereditary malady in the family of M. Turgot, had hindered him for several months from carrying on his plans.' In the midst of these sufferings his enemies were at work against him: all those who had lived by abuses—nobles, courtiers, financiers, farmers of the revenue—united in a confederacy against Turgot, and drove him from his office in less than two years.

After his retirement from office he occupied himself principally with the physical and mathematical sciences. He likewise indulged his early taste for literature and poetry.

Turgot's attacks of gout after his retirement became more and more frequent, and he died March 20, 1781.

The principal works of Turgot are:—'Réflexions sur la Formation et la Distribution des Richesses;' 'Lettres à M. le Contrôleur-Général sur le Commerce des Grains;' 'Extension de la Liberté du Commerce des Colonies;' several articles in the 'Encyclopédie;' and a few works on literary subjects.

TURIN. [Torino.]

TURKEY. [Pavonidæ; Poultry.]

TURKEY, or the *Ottoman Empire*, is chiefly in Europe and Asia. The African territories, Egypt, Fez, Tunis, and Tripoli, are now little more than nominally subject to the Sultan. The areas

and populations of the great divisions of the Turkish Empire may be approximately given as follows:—

In Europe.	Sq. Miles.	Population.
Albania	16,000	1,500,000
Bosnia, Croatia, and Hertsek	22,000	1,400,000
Bulgaria	20,000	4,000,000
Moldavia	17,000	1,400,000
Roumelia, or Rum-Ili	30,000	3,400,000
Servia	11,000	1,000,000
Wallachia	21,000	2,600,000
Islands	8,000	700,000
	145,000	16,000,000
In Asia.		
Anatolia, or Asia Minor	150,000	10,700,000
Armenia, Kurdistan, Mesopotamia, Syria, and Arabia	550,000	5,500,000
	700,000	16,200,000
In Africa.		
Egypt	17,000	2,000,000
Fez, Tunis, and Tripoli	70,000	2,800,000
	87,000	4,800,000
Totals.		
In Europe	145,000	16,000,000
In Asia	700,000	16,200,000
In Africa	87,000	4,800,000
	932,000	37,000,000

The whole of the Turkish Empire is divided into 36 Eyalets. [EYALET.]

The division named *Roumelia*, or *Rum-Ili*, comprehends the ancient *Thracia* and *Macedonia*. It is bounded E. by the Bósporus and Black Sea, S.E. by the Sea of Marmara, N. by the Balkan Mountains, W. by Albania, and S. by Greece and the Grecian Archipelago.

Government.—The Sultan of Turkey is absolute in this sense, that there is no political body in the empire which has any recognised power to check his will; but he must reign conformably to the religious, political, and civil principles contained in the Korán; conformably to the Sunna, or the words of the prophet Mohammed preserved by tradition; and to the unanimous decision of the assembly of the Ulemas, in which the Mufti presides; and conformably to the Kanunnáme, a kind of code, containing decisions and institutions which have been made since the beginning of the empire and conformably to the Korán.

The civil and religious law having only one source, the Korán, the highest dignitary is the Mufti, who is the supreme authority with regard to the legality of religious, civil, and political acts: he is the patriarch and the high chancellor of the empire. The Mufti and his counsellors, the high judges of Rum-Ili, of Anatoli, of Constantinople, of Mecca, of Medina, and several other high functionaries, are called 'the dignitaries of law' (Menasibi-sheriye), or 'the dignitaries of science' (Menasibi-ilmiye). The assembly of these functionaries is called the assembly of the Ulemas, or 'wise men.' All the Kadis, or judges, and the 'muderris,' or professors of sciences, are under the authority of the Mufti.

Inhabitants.—The inhabitants are divided into two great classes—the Turks, or more correctly, Turks-Osmanlis, who are the ruling race; and the Rayas, that is 'the flock,' who are the ancient inhabitants of the countries conquered by the Turks-Osmanlis. The Rayas, who are Christians, except some pagan tribes, are subject to the capitation or poll-tax, which the Osmanlis do not pay: they have the exercise of their religion with some restrictions, and they are dressed in a different way from the Turks. In general the Rayas, although they form communities and have their local authorities, are entirely in the position and have all the disadvantages of a subdued race. The Rayas are far more numerous than the Turks, especially in Europe. They belong to different nations. The Greeks are the most numerous. The nations of Slavonic origin, such as the Bosniacs (only the Christian Bosniacs are Rayas), the Servians, the Bulgarians, as well as the Armenians, are likewise very numerous. Several nations which have an origin different from that of the Turks-Osmanlis, are nevertheless not reckoned among the Rayas, because they have adopted the Mohammedan religion. To this class belong a great number of Kurd, Arabic, and Tartar tribes, the Mohammedan Bosniacs, and the Albanians, or Skypetars, the inhabitants of ancient Epirus. Foreigners in Turkey are considered as Rayas, but they are protected by the authority of their ambassadors and consuls.

Chronology.—The Turks, like all the other Mohammedans, have adopted the æra of the Hegira, which begins with the 16th of July, A.D. 622. [ÆRA.] The year of the Hegira contains 12 months of alternately 30 and 29 days, or, more exactly, 354 days, 8 hours, and 48 minutes; and 32 of our (solar) years are equal to 33 Mohammedan (lunar) years, 6 days, 8 hours, and 16 minutes.

Languages and Literature.—The Turkish languages form a particular family, which differ from the Arabic, the Persian, the Mongol, and the Chinese. The principal Turkish languages are the following:—

1. Uighur. This language is considered the most ancient and the purest of all the Turkish dialects, and is still spoken in eastern Turkistán, especially in the country between Káshghar and Kámul. 2. The Jagataï is the language of the greater part of independent Turkistan; and it has a valuable literature. 3. The Kiptshak dialects in the eastern part of European Russia, and in Western Siberia. 4. The Kirghiz. 5. The language of the Turkish tribes in southern Russia. 6. The Turkoman. 7. The southern Siberian dialects, which are very numerous. 8. Chuwash, spoken by the Chuwashes, who live between the

Sura and the Wolga. 9. The Osmanli or Turkish, commonly so called, which is spoken by the Turkish conquerors of the Byzantine Empire. It is the richest and most polished of all the Turkish dialects. Turkish is now the diplomatic and official language not only of Turkey, but Egypt, Tunis, and Tripoli, and formerly of Algiers. The Osmanlis having received their civilisation from the Arabs and the Persians, and the Korán (which among the Mohammedans is never translated from the Arabic into any other language) being still the source of theology and legislation, a great many Persian and Arabic words have gradually found their way into the Turkish language. However the groundwork of the Turkish language is Turkish, and the Turks pronounce the Arabic words in a much softer way than the Arabs, a difference which is principally remarkable in the pronunciation of the gutturals and the long vowels.

The Turkish alphabet is composed of thirty-three letters, twenty-eight of which are taken from the Arabic alphabet, four from the Persian, and one, the 'Saghir nún' (ñ) is exclusively Turkish. These letters are written from right to left. Turkish is also, and very frequently, written with Armenian characters, especially by the merchants.

The Turkish literature is of ancient origin. During the reigns of Osman and his successors, a great number of Arabic, Persian, Greek, and Latin works were translated into Turkish. Mohammed II. ordered a translation of Plutarch; Soliman I. had the 'Commentaries' of Cæsar translated; and Aristotle and Euclid were translated in the commencement of Turkish history. Mustafa III. made a translation of the 'Principe' of Machiavelli, and of the 'Anti-Machiavel' of Frederic II., king of Prussia. Some of the works of Boerhaave, Sydenham, Bonnycastle, Vauban, Lalande, Cassini, and, in later times, a great number of English, German, and French works on history, geography, medicine, chemistry, mathematics, and the military sciences, have likewise been translated into Turkish. The original literature of the Turks is valuable, though less so than that of the Arabs. They have poets, many historical writers, biographers, and numerous works on morals, divinity, and philosophy.

History.—The Turks-Osmanlis are a branch of the Turks in the larger meaning of the word. The Turks are thinly spread over an immense extent of Asia, from the desert of Gobi to the shores of the Mediterranean, and from the northern part of Siberia to the Persian Gulf. In Europe the Turkish population is compact in Rúm-Ili (Roumelia), and in the government of Kazan and some adjacent tracts in eastern Russia. In Africa there are only a few Turks-Osmanlis.

We cannot precisely ascertain when the Turks (we speak in the larger meaning of the word) first appeared in Europe. The general opinion is, that they became first known to the Europeans, but through the Byzantines, in the fourth or fifth century. They were certainly known to the Chinese several centuries before they had an historian in Europe.

The Turks have been divided from the remotest times into a great variety of tribes. Of these, the Khazars and the Tartars of the Golden Horde, or of Kiptshak, have been noticed under TARTARS.

The other principal tribes were the Oghuzes, the Seljuks, and the Osmanlis. The Oghuzes, according to tradition, were the parent race, and were frequently at war with the Persians and Arabians. At one time (A.D. 711) they had conquered Bokhara and Samarcand, and extended their dominion as far as China; but in the 11th century they were subjected to the Seljuks. [SELJUKIDES.]

Urkhan (A.D. 1326 till 1359) was the successor of Othman, or Osman, and his eldest son. His reign was signalised by conquests, and by some political and military institutions which have been the groundwork of the Turkish constitution until our days. His brother and prime minister, 'Alá-ed-dín, assisted by the high judge Kárá Khalíl Chenderelí, established the famous body of the Janizaries. [JANIZARIES.] In this reign the Turks crossed the Dardanelles, and first established themselves in Europe. Urkhan was succeeded by his younger son Murad (1359 till 1389), the elder Soliman having lost his life by a fall from his horse. Murad took Adrianople, the second capital of the Byzantine Empire, which he afterwards chose for his residence, and by his other victories spread the terror of the Turkish name all over Europe. Murad also carried his arms into Asia with great success. During his reign, the feudal system was developed and strengthened by several regulations.

Bayazid I. (1389–1403), the eldest son of Mürad I., was the first chief of the Osmanlis who assumed the title of sultan. [BAYAZID I.]

After the battle of Angora, Timur reinstated the Seljukian princes of Karamania, Aïdin, Menteshe, Tekke, and Kermian, who had been deprived of their dominions. [TIMUR.] After Timur's death (A.D. 1405) wars broke out among these princes, each of whom aimed at the possession of the ancient empire of the Seljuks. In the meantime the throne of Othman had become vacant by the death of Bayazid, and the succession was disputed among three of his sons, Soliman, Isa (Jesus), and Mahomet. After several years of warfare the victory of Chámurlí established Mahomet as sole sultan. [MAHOMET I.] He left to his son, Murad II., an empire of greater extent than that of Bayazid before the invasion of Timur.

Murad II. (1421 till 1451) distinguished himself by his conquests; particularly by his complete defeat of the Hungarians when they invaded Turkey in 1444.

Mahomet II. succeeded to the throne in 1451. His reign is memorable for the conquest of Constantinople, which became the capital of the sultans. He was succeeded by Bayazid II. [BAYAZID II.]

Selim I., his son, was the next sultan [SELIM I.], and the father of Soliman the Magnificent. [SOLIMAN I.]

During the reign of Soliman, notwithstanding its outward splendour and prosperity, the Turkish

empire began to show symptoms of decline, which became more manifest under the rule of his successor. [SELIM II.]

Murad III., or Amurad III., was the son of Selim II. (1574 till 1595). Although this sultan was governed by favourites and by women, Turkey was enlarged during his reign by some important conquests, and had diplomatic relations with almost all the nations of Europe. During the reign of his successor [MAHOMET III.] the war with Austria was continued; and towards its close Delí-Husein rebelled in Asia, and was the cause of thirty years' troubles and civil war.

These events disturbed nearly the whole of the succeeding reign. [AHMED I.] Mustafa I., the brother of Ahmed, ascended the throne in 1617, and descended from it in six months, in consequence of a revolution in the seraglio. He was confined to a prison, and his successor was his nephew.

Othman II., the son of Ahmed I. (A.D. 1618 till 1622). A short but unhappy war with Poland was the most remarkable event of the reign of this prince, who was deposed and put in prison, where he was strangled. His uncle, the deposed Mustafa, was delivered from his captivity and proclaimed sultan.

Mustafa I. continued his reign from May 20, 1622, till Aug. 30, 1623. The incompetence of this prince had been seen in his first reign; during his second reign he showed all the symptoms of insanity. Dáud-Pasha, his favourite, was killed by the Janizaries; his next favourite, Husein-Pasha, was a blood-thirsty tyrant. He and the sultan were both deposed by the Janizaries.

Murad IV., or Amurad IV., the brother of Othman II., and the son of Ahmed I. (A.D. 1623 till 1640). He was a child of twelve when he was raised to the throne, and for the first ten years he reigned under the guardianship of his mother. During the last seven years of his reign, he evinced the character of a cruel but enterprising tyrant. Shortly after his accession, Bekir, Pasha of Bagdad, rebelled, and a civil war resulted, in consequence of which Asia Minor was ravaged, and Bagdad fell into the hands of the Persians. In the meantime a rebellion of the Tartars had taken place, the Cossacks had ravaged the shores of the Bosporus, and the Janizaries had revolted. These disasters were at length terminated, and the sultan himself having taken Bagdad by storm (Dec. 25, 1638), peace was concluded with Persia in 1639. Murad IV. died in 1640.

Ibrahim I. the youngest brother of Murad IV., and son of Ahmed I., reigned from 1640 till 1648. He spent his time in luxury and debauchery. Abuses of administration, violent measures, and frequent rebellions, characterised this reign. Ibrahim perished in consequence of a revolt of the Janizaries, and was succeeded by his son. [MAHOMET IV.]

Soliman II. (III.) the brother of Mahomet IV., and son of Ibrahim I. (1687 till 1691), and Ahmed II., brother of Soliman II. (III.), and Mohammed IV., son of Ibrahim I. (1691 till 1695). During these reigns the Austrians took Belgrade, and routed the Turks at Slankamen, whereupon the fortress of Grand-Waradin surrendered to the Emperor Leopold I. The Venetians conquered Chios. The internal state of the empire was deplorable. There was rebellion in all the provinces.

Mustafa II., the son of Mohammed IV. (1695 till 1703). During this reign Peter the Great concluded an alliance with Austria against Turkey, and laid siege to Azof. This key of the Don fell into his hands in 1696. The peace of Carlowicz was concluded in 1699. An insurrection took place, and sultan Mustafa was deposed in 1703.

During the reign of his successor, European arts and sciences found their way to Constantinople, where the first printing-office was established. [AHMED III.] Mahmud I. was the next sultan. [MAHMUD I.]

Othman III., the brother of Mahmud I., reigned from 1754 till 1757; and Mustafa III., the son of Ahmed III., from 1757 till 1773. The short reign of Othman III. is not remarkable for any events of importance, except some diplomatic transactions with Prussia. Mustafa declared war against Russia in 1768, and the result was most disastrous for Turkey. The Russians stirred up an insurrection in Greece, and proclaimed the independence of that country; and in 1770 they destroyed the Turkish fleet in the bay of Chesme, after the battle of Lepanto the greatest disaster which had befallen the navy of Turkey. The Turks were again beaten at Rusjuk and Kaïnarji, and although the seraskier Othman-Pasha obtained considerable advantages over the Russians at Silistra, Rumanzow defeated him in his turn at Karasu in Bulgaria. Mustafa III. died Dec. 24, 1773.

'Abdú-l-Hamid I., or Ahmed IV., the son of Ahmed III., reigned from 1773 till 1789. During this reign the Porte yielded to the propositions of Russia, and peace was concluded in 1774. By the peace of Kuchuk-Kaïnarji Turkey was brought to a political dependence on Russia; and, notwithstanding many bloody wars, the Porte has not succeeded in shaking off the yoke.

'Abdú-l-Hamid in 1787 declared war against Russia and Austria, a course which only brought fresh disasters upon the Turks. Potemkin took Oczakow by storm 1788, and the garrison and the inhabitants were massacred. 'Abdú-l-Hamid died soon afterwards.

Selim III. was one of the most enlightened men of his nation and of the East. [SELIM III.] After the peace of Jassy Selim began his work of reformation, but during a long period his efforts were checked by troubles in Syria and Egypt: by the rebellion of Paswán Oghlu, pasha of Widdin; and by the increasing power of Ali Pasha of Janina. [ALI PASHA.] The conquest of Egypt by Bonaparte led to a war with France; but peace with France was concluded in 1802, no change taking place, except that France acquired the free navigation on the Black Sea, a privilege which was soon afterwards granted to England and to several other European powers. In order to regenerate his army, Selim appointed a commission, from which the troops received a new organisation, the 'Nizam Jedid,' by which they were put on a

footing similar to that of European armies. He also introduced several changes into the system of taxation: he gave a new organisation to the diwan; but in order to fill the treasury he debased the money. These reforms were the pretext for many rebellions. A war broke out between Turkey and Russia, assisted by England (Dec., 1806). The defeats of the Turkish army were considered by the people as a consequence of the Nizam Jedid, and the Janizaries broke out in rebellion. Selim III. was deposed, and confined to the Seraglio.

Mustafa IV., the son of 'Abdú-l-Hamid, reigned from 1807 till 1808. Immediately after his accession Mustafa abolished the reforms of his predecessor. The Turkish fleet was entirely defeated by the Russians off Lemnos, and terror spread over Constantinople. He was eventually deposed, immediately after Selim III. had been murdered by his orders. He was succeeded by Mahmud II. [MAHMUD II.]

Sultan 'Abdú-l-Mejid I., the son of Mahmud II., is the present sultan. He was born May 6, 1822, and began to reign July 1, 1839. He was delivered from his dangerous position by the intervention of England, Russia, and Austria. Admiral Napier took Beyrút and St. Jean d'Acre (1840), and in one campaign Ibrahim-Pasha was compelled to evacuate Syria, which was restored to the authority of the sultan. Mehemet Ali however was recognised as Pasha of Egypt with her dependencies, and paid an annual tribute to the sultan. Mehemet Ali died July 2, 1849, and the sultan confirmed his grandson, Abbas Pasha, in the government of Egypt.

TURKEY BUZZARD (*Cathartes Aura*, Ill., *Vultur Aura*, Linn.).

This species, descriptions of which occur in the works of Marggravius (1678), Sir H. Sloane (1725), Catesby (1771), and other older writers, is spread throughout South America, and the southern portion of the United States. It is common in Jamaica and other West India Islands. Wilson ('American Ornithology') describes the Turkey Buzzard as gregarious, numbers roosting together on the limbs of large trees; they may be thus seen in rows, spreading out their wings, to catch the rising sun of a summer morning, and remaining in that posture for a considerable time. They are, he adds, often seen in companies, soaring at an immense height, particularly previous to a thunder-storm. It is doubtful however whether this species is truly gregarious. Mr. Waterton observes that though flocks collect to a common feast, they do not form a colony like rooks, but each pair pursues its separate interests. This agrees with the observations of Mr. Darwin, who says, 'the Turkey-Buzzard is a solitary bird, or at most goes in pairs. It may at once be recognised at a long distance by its lofty soaring and most elegant flight. It is well known to be a true carrion-feeder. On the west coast of Patagonia, among the thickly-wooded islets and broken land, it lives exclusively on what the sea throws up and on the carcases of dead seals; and wherever these animals are congregated on the rocks, there the vultures may be seen.'

In Jamaica this bird is known by the name of John Crow. So valuable, says Mr. Sells, are its services in the removal of carrion and animal filth, that the legislature has imposed a fine of 5*l.* upon any one who destroys it within a stated distance of the principal towns. Its ordinary food, he says, is carrion, but when hard pressed with hunger it will seize upon young fowls, rats, and snakes. He notices the highly-offensive odour emitted from the eggs of this species when they are broken, and then relates several instances, from personal observation, for the purpose of proving that the *Vultur aura* possesses a very acute sense of smell.

On this disputed subject we refer to Mr. Sells's details, and to Professor Owen's account of the dissection of two heads of the *Vultur aura* in the 'Proceed. Zool. Soc.,' 1837.

Nidification, &c.—Nuttall remarks that the Turkey-Buzzard has not been known to breed north of New Jersey in any of the Atlantic States; and he says that they seek out the swampy solitudes, and, without forming any nest, deposit from two to four eggs in the stump of a hollow tree or log, on the mere fragments of rotten wood with which it is ordinarily strewed. Occasionally, in the Southern States, they have, he tells us, been known to make choice of the ruined chimney of a deserted house for this purpose. The eggs, which are described as being larger than those of a turkey, are yellowish white, blotched irregularly with dark brown or blackish spots, at the larger end chiefly. The male often attends while the female is sitting; and, if not materially disturbed, they will continue to occupy the same place for several years in succession. The young, which are covered with a whitish down, will, like their parents, eject the filthy contents of their stomachs over those who molest them. ('Manual of the Ornithology of the United States, and of Canada.')

Turkey Buzzard (*Cathartes Aura*).

The Turkey-Vulture is about two feet and a half in length. The head and upper part of the neck are naked, reddish, and wrinkled; back of the head and of the neck sooty black; plumage glossy brownish black, with green reflexions. This species must not be confounded with the *Gallinaza* (*Cathartes atratus*) of the same

regions, and which in Peru is protected as a scavenger.

TURKEY-HONE is a slaty, grayish, opaque, soft kind of stone, found in various parts of Europe and Asia. It is composed of silica, lime, alumina, and carbonic acid. When cut and polished, it is used for sharpening small cutting instruments.

TURKISTA'N means the 'country of the Turk,' and is used to designate a region peopled by the tribes of that race, or in which it is at least the dominant race. The name has been applied at different times to different regions. At present its recognised limits are nearly from 36° to 55° N. lat., and from 52° to 89° E. long. It may, in general terms, be said to include Independent Tartary in its widest sense.

Surface.—Near the southern frontier of Turkistan is lake Sir-i-kol, about 14 miles long. The river Amu flows from the western end of this lake. The land south of the Amu above its lowest fords immediately attains a high general level; and among the mountains which traverse it many rivers take their rise. Yarkand (38° 19′ N. lat., 76° 18′ E. long.) and Kashgar (39° 25′ N. lat., 73° 56′ E. long.), which appear to have an extensive plain to the east, and are evidently on a much lower level than the country to the west of them, may be assumed as the eastern limit of the high table-land of Pamir. At the western base of this enormous table-land is the broad valley of the Oxus: at its eastern base is the plain which extends between the high land of Tibet on the south and the Thian-shan on the north, as far as lake Nor; and north of it is the comparatively low country which slopes from the plains of Songaria westward to lake Aral and the Caspian.

The Plain of the Oxus extends from 36° to 44° N. lat., and from 54° to 68° E. long. The Oxus is formed by the junction of the Amu Deria with the Kunduz, and flows into the sea of Aral. Below the junction of the Kunduz the Amu receives no affluents of any magnitude; the rivers of Kulm, Balk, Herat, and Meshea, Kurshi, and Bokhara, are either absorbed by the dry desert or by canals of irrigation before they can reach it. From the banks of the Amu to the Elborz on the south-west, and to the snowy mountains east of Kurshi on the east, extends an immense plain, the elevation of which, towards its southern extremity, is at Balkh 1718 feet above the level of the sea, and at Khulm 1437. At Bokhara its elevation is 1201.

The comparatively low country lying northward of the high table-land of Pamir extends to Siberia on the north, to the Aral and the Caspian on the west, and to the Chinese Empire on the east. It contains a few ranges of hills, and numerous rivers, which for the most part find an outlet in the great Siberian rivers, such as the Ural, the Tobol, the Irtish, and the Ischil. Some however lose themselves in brackish lakes.

Very little is known of that extensive range of country which lies east of the great elevation of Pamir, and has been called by recent geographers Chinese Turkistan. The Thian-shan extends along its northern side, and Lop-Nor appears to form its eastern boundary.

Climate and Productions.—A region of the earth's surface which has such wide limits, and which varies from an elevation of more than 18,000 feet above the level of the sea to about 82 feet below it, must necessarily present a great variety of climate and geological structure, and, in consequence of that variety, an equal diversity of vegetable and animal life. So small a portion of this region has however been hitherto accessible to scientific research, and the investigations of the few scientific travellers who have visited it have been distracted by so many impediments, that our information on these points is meagre in the extreme.

The geological formations are very numerous. Limestone has been met with on the banks of the Kokcha, iron-ore in many places, ruby and jade on the banks of the Amu, turquoises north-west of Bokhara, coal between Kashgar and Kokand, isolated hills of red granite near the Irtish, copper and lead near the river Turgai, and salt in many different parts.

Between Kunduz and Sir-i-kol, at an elevation of from 8000 to 10,000 feet above the sea, a kind of dwarf fir occurs in the valleys. From 10,000 to 12,000 feet the red willow and white poplar are met with. Fruit-bearing trees of the plum genus are found at Langer Kish, 10,800 feet above the sea. Above 12,000 feet the red willow alone occurs, but that hardy plant flourishes as high up as Sir-i-kol. Groves of tolerably-sized firs occur in the ravines of the Kulm River, south of Kunduz; but there are no timber-trees on the Hindu Kush. The asafœtida plant and the furze of Tartary are the characteristic plants of the mountains south of Balkh. The grass on the pastures around the Sir-i-kol, and on the high lands west of that lake and south of the Amu, is in general very luxuriant. Large quantities of wheat and other grains are produced round Kunduz; and apricots, plums, and other fruits in great abundance and of excellent quality at Kunduz, Kulm, and Balkh. The almond and pistachio-nut are natives of the secondary ranges on the north face of the Hindu Kush. The great plain on both sides of the Amu is in most places a barren waste, or thinly covered with straggling furze. In the oases of Kulm, Balkh, Serrukhs, Merve, Kurshi, Bokhara, and Khiva, and on the banks of the Gurgan, most kinds of fruit, vegetables, and grain are brought to perfection.

The most important animal on the highlands of Pamir is the yak, or kash-gow, a diminutive species of the ox. It is to the inhabitants of Tibet and Pamir what the rein-deer is to the Laplander. The gigantic argali, or mountain-sheep, and the markhor, a large species of goat, are also abundant in the high regions. The only other quadrupeds met by Lieutenant Wood at the sources of the Amu were wolves, foxes, and hares. The animals in the surrounding plains are much more numerous.

Inhabitants.—In Turkistan the predominant race, as its name implies, is the Turk. The Kirghiz, properly so called, inhabit the high table-land of Pamir and its bordering mountains and valleys. They are nómades, and have a bad

reputation, even in that region, for their thieving propensities. They are a people of low stature, with Mongolian countenances, though speaking a Turkish dialect. The tribes called Kirghiz by the Russians, who roam the steppes from the north declivity of Pamir and southern shore of the Aral to the Russian frontier, and from the Caspian to the Chinese frontier, are divided into the three great hordes. The Turkoman tribes range the deserts around the Amu and Caspian, from the Ust-urt to the frontiers of Persia and Balkh: these tribes appear, from their lineaments as well as from their language, to be more free from any mixture of Mongol blood than those previously mentioned. The Turkish clans possessed of political power in Khiva, Bokhara, Kunduz, and Kokand are called Uzbeks: in their lineaments they bear a considerable resemblance to the Kirghiz. Among other dwellers in these regions are Afghans, Jews, Hindoos, and Persians. The predominant religion among all these tribes is the Mohammedan; but some of the hill Kirghiz are said still to adhere to Shamanism; and Lieutenant Wood, on his journey to the Sir-i-kol, observed many curious traces of lingering impressions from the creed of the Guebres.

The political divisions of Turkistan are as follows:—

1. The population of the Kirghiz and Kazaks, or Cossacks, is estimated at 400,000 tents or families, divided among three hordes. 2. The Turkomans have been variously estimated, some carrying them as high as 366,000 families; but this estimate includes a number of tribes subjected by the khans of Khiva. 3. The sway of the Khan of Khiva extends as far south as a station on the Murgab, 12 miles above Merve; and the Turkomans of Sherrukhs, on the road to Meshed, are in some measure dependent on him. On the west his authority appears to be acknowledged as far as the Caspian. To the north and east his direct power does not appear to pass the delta of the Amu. The Uzbeks are the dominant tribe at Khiva. The population of Khiva proper is estimated at 300,000 inhabitants, but the tribes reduced to a more or less perfect degree of submission must be much more numerous. 4. The territories of the Mir of Bokhara. [BOKHARA.] 5. Kokand in its present extent is composed in a great measure of successive conquests by its present ruler. 6. Chinese Turkistan has been completely organised as a Chinese province, under the designation of the Country of the New Frontier. Chinese garrisons are placed in Kashgar, Yarkand, and other towns. 7. The Mir of Kunduz exercises an authority much of the same kind as that exercised by the khans of Khiva and Kokand. His dominions extend on the west to a station nearly midway between Kulm and Balkh; on the south to Sykan, north of Bamian, and farther west to the crest of Hindu-Kush; on the east to the Chinese frontier.

Commerce.—Turkistan is formed by nature to be the scene of a transit commerce between the countries which surround it on all sides, rather than of a trade in its own productions. Balkh, Bokhara, and Kokand produce silk and cotton; the Pamir and Hindu-Kush supply furs; all the oases large quantities of fruit and grain; metals are raised and smelted in various localities; the steppes supply beasts of burden and for food; and at Kokand and Bokhara silk and cotton stuffs are manufactured. Still the prosperity of the habitable parts of Turkistan has from the beginning been mainly dependent on its transit trade. Bokhara, the seat of the oldest and best consolidated government in Turkistan, is the principal centre of this commerce. [BOKHARA.] Khiva has a commerce of its own with the Turkomans of the Caspian, with Astrabad, and by way of Merve with Meshed. Kokand is an entrepôt of the trade between Bokhara and Kashgar, but it is also visited by caravans from Russia. Kunduz has little trade. Kashgar and Yarkand, lying at the intersection of the great lines of traffic which connect Russia with Tibet and Kashmir, and China with West Turkistan and Tibet, and being moreover situated in productive countries, are the centres of an active and lucrative trade.

History.—Alexander the Great crossed Western Turkistan from the western termination of the Hindu-Kush by the sites of Balkh, Kurshi, and Samarcand, to the south-west curve of the Sirderia, and appears to have found the region at least as populous and wealthy as at present, and occupied by a number of petty states virtually independent. After the death of Alexander, the Grecian dynasty of Bactria appears to have ruled the country as far north as the Aral till about 120 years before the commencement of the Christian æra. The Greek power north of Hindu-Kush was then subverted by Scythians from the east, who were in their turn expelled by the Parthians. In 569 the ambassadors of the younger Justinian found the most powerful of the Turkish tribes seated around the Altai, and Turkish hordes had pushed their encampments as far west as the Caspian. The first princes who inherited the power of Gengis Khan were Mongols; but the Turkish tribes would appear to have predominated in their armies. All the Turkish tribes who have played a conspicuous part in history embraced at an early period the Mohammedan religion; their dialects have in consequence been more or less modified by an admixture of Persian and Arabic, and their historical traditions are those common to all Moslems. The origin of the name Turkoman is difficult to ascertain. The Turkomans are the Turkish tribes who in the 11th and 12th centuries crossed the Amu and invaded Persia. The name is common to those who still inhabit Turkistan with many tribes in Persia and the Ottoman Empire.

TURKS. [TURKEY.]

TURMERIC. [CURCUMA.]

TURNE'BUS, ADRIAN, one of the most celebrated French scholars of the 16th century. His French name was Tournebœuf. The common account is that he was born in 1512, at Les Andelys in Normandy, and in his eleventh year he was sent to Paris to be educated. His talents and diligence soon raised him above all his fellow-students. After the completion of his studies he was for some time engaged in teaching the ancient

languages at Toulouse, and in 1547 he was appointed professor of Greek at Paris, whither his name and that of A. Muretus attracted students from all parts of Europe. In 1552 he undertook in conjunction with William Morel the management of the Royal Printing Establishment of Paris for Greek books, but after the lapse of three years he resigned this office for that of Royal Professor. He remained at Paris until his death, on the 12th of June, 1565.

Seldom has a scholar in his lifetime enjoyed such a universal reputation as Turnebus. He was a man of a diffident, modest, and very amiable character. As a scholar he was not inferior to any of his contemporaries. His works consist of philological dissertations, some of which are polemical, critical commentaries on various ancient authors, and translations of Greek writers into Latin. His criticisms are generally masterly, but, like most great critics, he was too fond of making conjectural emendations. His Latin translations are excellent; and his Greek translation of Cicero's essay 'De Fato' is a proof of his thorough knowledge of the Greek language. Most of his works were collected and published after his death by his second son, Stephen Turnebus, Strasburg, 1600, 3 vols. fol. Besides the works contained in this collection, he wrote several others, the best of which is his 'Adversaria,' consisting of 3 vols. 4to.

TURNER, WILLIAM, was born at Morpeth in Northumberland, about 1520. He studied at Cambridge, directing his attention principally to physic and divinity, and having taken a very decided part in the great religious questions of the day, he was thrown into prison. After his release he resided on the Continent till the death of Henry VIII. During the reign of Edward VI. he was made physician to the protector Somerset, and was afterwards made a prebendary of York, dean of Wells, and a canon of Windsor. He was however again obliged to fly to the Continent on the accession of Mary, where he remained till the reign of Elizabeth, when he returned, and was restored to all his original benefices. He died July 7, 1568.

Turner had studied botany abroad, and is said to have published several works on that subject. The one on which his reputation as a botanist rests, is his 'Herball,' which was first published entire at Cologne in 1568. He also published several works on controversial divinity; a collation of the translation of the Bible into English, with the Hebrew, Greek, and Latin copies; and some works on zoology and on medicine.

TURNER, SHARON, was born in 1768. He was brought up to the law, became an attorney, and resided in Red Lion Square, London. He had early begun the study of the Anglo-Saxon language and literature, and in 1799 published 'The History of the Anglo-Saxons from their first appearance above the Elbe to the Death of Egbert, with a Map of their ancient Territory, 8vo. This volume was followed by 'The Second Part of the History of the Anglo-Saxons, from the Death of Egbert to the Norman Conquest,' 2 vols. 8vo., 1801; and 'The History of the Manners, Landed Property, Government, Laws, Poetry, Literature, Religion, and Language of the Anglo-Saxons,' 8vo., 1805. Meantime, while this 4th volume was in preparation he had published a 'Vindication of the Genuineness of the Ancient British Poems of Aneurin, Taliesin, Llywarch Hen, and Merdhin, with Specimens of the Poems,' 8vo., 1803. He subsequently published a 'History of England during the Middle Ages, from the Norman Conquest to the End of the Reign of Henry VII.,' a 'History of the Reign of Henry VIII.,' and a continuation from the Accession of Edward VI. to the Death of Elizabeth, the whole forming 12 vols. 8vo. He wrote a few other works of less importance, and was an early contributor to the 'Quarterly Review.' He received from the crown a pension of 200*l.* a year. He died Feb. 13, 1847.

TURNERA'CEÆ, the name of a natural order of plants, belonging to Lindley's parietose group of polypetalous Exogens. The species of this order are exclusively natives of the West Indies and South America. The genus *Turnera*, which is the type of the order, was named in honour of Dr. Turner. Don, in his edition of Miller's 'Dictionary,' enumerates 49 species of *Turnera*, all of which are found in South America and the West Indian Islands.

TURNERITE, a yellowish, translucent crystal, composed principally of alumina, lime, and magnesia, with a small quantity of iron, and a minute portion of silica.

TURNHOUT. [ANTWERP, *Province.*]

TURNING, the process of giving a circular form to wood and other materials, by means of a lathe and cutting tools, as in wood and metal turning, or by the thrower's wheel (which is also a species of lathe) and shaping instruments, as in the manufacture of earthenware. The lathe may be described as a machine for moving the material to be wrought in such a manner that, being fixed opposite to the tool, any point in the circumference will act upon the whole circle in precisely the same way.

TURNIP, the common name of the *Brassica rapa*. The turnip in its wild state is a native of Great Britain, and is frequently found in the borders of fields and waste places. By cultivation the size of the plant, especially the root, is sometimes enormously increased. The young leaves and buds of the turnip are gathered and eaten under the name of 'turnip-tops.' The roots consist of a large mass of soft cellular tissue, in which starch and sugar are deposited. The root of the turnip contains a large proportion of water. Dr. Lyon Playfair, in an analysis of the food of cattle, made at the request of the Royal Agricultural Society, gives the following as the ingredients in 100 parts of turnips:—

Water	89
Unazotised matters (starch and sugar)	9
Albumen	1
Inorganic matter . . .	1
	——100

The turnip as a culinary root has been prized from the earliest times, and many varieties have been cultivated for the table; but it is those of a

larger kind, cultivated in the fields, which form so important a part of the most improved systems of agriculture on all light soils, that the success of the farmer is in general proportioned to the quantity of turnips raised on his farm. They are the great foundation of all the best systems of cropping, by supplying the manure required for the subsequent crop, and, at the same time, clearing the land of all noxious weeds, by the numerous ploughings, stirrings, and hoeings which they require.

The early vegetation of the seed is essential to a good crop of turnips. In its young and tender state it is liable to a variety of accidents. Its great enemy is the Turnip-Fly. [TURNIP-FLY.]

In order to have a heavy crop, especially of Swedish Turnips, or *Ruta Baga*, it is advisable to sow the seed early, that is, in the beginning or middle of May. They will then have the advantage of the summer showers, and be beyond the reach of the fly in a very few days; and when the dry weather sets in they will already have a supply of moisture in their roots, and the fibres having struck deep, will not suffer any check.

The White Norfolk Turnip and its varieties should be sown about midsummer, to have a good and heavy crop before winter. The distance at which they may be left in thinning them out must depend on the variety, whether it has a wide-spreading top or not. The best crops, both of swedes and common field turnips, are generally those which have the tops vigorous and moderately spreading. A small top will not nourish a large bulb; but when the growth is chiefly in the leaves, the bulbs are seldom large.

It is advantageous to have different varieties of turnips, which will come to perfection in succession; and it is useful to sow some at different times for this purpose. The small turnip, which from its rapid growth is called the Nimble Turnip, may be sown as late as the end of August, and in mild seasons will produce tolerable bulbs in winter and early in spring. The frost will not injure a growing turnip so readily as one which is come to perfection and the leaves of which are withered.

There are so many varieties cultivated, that it is difficult to enumerate them. The Swedish Turnips may be classed according to the colour and size of their tops and the shape of the bulb. The best have but little stem rising from the bulb, and a good tuft of leaves. The substance of the turnips is of a bright yellow and has a strong smell, especially when they have been kept some time. No frost will hurt them, if they are kept dry; but alternate rain and frost will hurt them. The common Norfolk Turnip is round and flat, the bulb being half buried in the ground; it throws out no fibres, except from the slender root which proceeds from the centre of the bulb. The Globe Turnip takes its name from its shape; it rises more out of the ground, and grows to a greater size. It is on the whole the most productive and hardy.

Turnip-seed is often raised in the gardens of cottagers, whose children keep off the birds, and it is a branch of industry which every farmer should encourage. He can readily see that good bulbs only are used, and he secures the seed he wants, while the cottager is well paid for his trouble. This is perhaps the most convenient mode of raising the seed on a large farm. If the seed is kept in a dry granary, it will be good for several years. It is however best to use fresh seed, as it always germinates sooner. The seed is seldom steeped, but generally drilled in the rows by a drill-barrow or more perfect sowing-machine. The best farmers, even on land well manured and in good heart, sow with the seed some artificial manure, as bones, rape-cake, or rich dried compost, to accelerate the first growth of the plants. Machines which sow the seed and manure in drills at the same time may be had of most of the manufacturers of improved agricultural implements.

TURNIP-FLY, a name popularly applied to the *Haltica* (or *Altica*) *nemorum*, a little insect belonging to the order *Coleoptera*, which annoys the farmer by destroying his crop of turnips, when in the early stages of their growth. The species of the genus *Haltica* are remarkable for their power of leaping, which is effected by means of the peculiar formation of their very thick hind legs. They are among the smallest of beetles, and are variously coloured with green, brown, or yellow, often brightly shining. Some destroy the cabbage, others flax, others tobacco or hops; but the turnip is the greatest sufferer from the ravages of these little creatures, which, though small in size, are many in number. They love sunshine, warmth, and fine weather, and eat away the surface of the young leaves of the plant with voracity. The larva feeds within the full-grown leaf, in which the egg has been laid and attached by its parent, but does little or no mischief to the growth of the plant. It is the beetle which destroys the first smooth leaves or cotyledons of the turnip. It scents out the turnip crop from a great distance, and flies towards it even against the wind. It feeds by night, and during the day retires under the cotyledon. The parent insects are to be seen in the earliest fine days of February, and do not disappear before the end of October, but they do not feed much after the latter end of September. There are five or six broods of these in a summer. Besides the *Haltica nemorum*, which is of a shining black, with a yellow stripe down each elytron, the *Haltica similis* and *H. flava* are also destructive to turnips.

The destruction caused by these insects may be conceived when, so long ago as 1786, Mr. Young stated that the turnip crop destroyed in Devonshire alone was valued at 100,000*l.*; consequently many entomologists have directed their attention both to the inquiry into the habits of the animal, and the finding a remedy for the mischief it causes. Admirable essays on the subject have been published in the 'Entomological Transactions' by Mr. Le Keux, and in the 'Journal of the Agricultural Society of England,' by Mr. J. Curtis, which may be consulted with advantage by the farmer.

Among the remedies which have been proposed are fumigation, watering with weak brine, steeping the seed in brine, applying lime and soot to the land, and the application of wormwood decoction and road-dust. The last has been greatly recom-

mended in Germany, but English authors question its efficacy, and as yet it is very doubtful whether we have discovered any efficient means of opposing this mischievous little beetle.

TURNPIKE TRUSTS. Turnpike-roads are a peculiar species of highways placed by the authority of acts of parliament under the management of trustees or commissioners, who are invested with certain powers for the construction, management, and repair of such roads.

Besides the various local acts, there are several acts of parliament called General Turnpike Acts, the provisions of which extend and apply to all existing and subsequent local acts. The subsisting enactments upon this subject are contained in 3 Geo. IV., c. 126, which repeals former General Turnpike Acts; 4 Geo. IV., c. 16, c. 35, c. 95; 5 Geo. IV., c. 69; 7 & 8 Geo. IV., c. 24; 9 Geo. IV., c. 77; 1 & 2 Wm. IV., c. 25; 2 & 3 Wm. IV., c. 124; 3 & 4 Wm. IV., c. 80; 4 & 5 Wm. IV., c. 81; and 5 & 6 Wm. IV., c. 18, c. 62. The General Highway Act (5 & 6 Wm. IV., c. 50) also contains certain provisions applicable to turnpike-roads; but, by the 113th section, does not extend to them except where expressly mentioned.

The trustees of turnpike-roads consist of persons nominated for that purpose in the Local Acts, who must be persons possessed of a certain property qualification, and of the justices of peace of the county or counties through which the roads pass; but all persons who are contractors or otherwise personally interested in the roads are disqualified from being trustees. (3 Geo. IV., c. 126, ss. 61, 62, *et seq.*) They are exempt from personal liability for acts done in pursuance of their powers, and may sue and be sued in the name of their clerk. (7 & 8 Geo. IV., c. 24, ss. 2 & 3; 3 Geo. IV., c. 126, s. 74.)

TURPENTINE. [RESINS.]

TURPENTINE TREE, the name given to some of the species of trees belonging to the genus *Pistacia*. The genus *Pistacia* belongs to the natural order *Anacardiaceæ*, and is known by the possession of diœcious flowers, which are without petals.

The Venetian Turpentine-Tree, or Turpentine Pistachia-Tree, *P. terebinthus*, is a tree growing to the height of 30 feet. The fruit is round, not succulent, and somewhat furrowed, and when ripe of a dark blue colour. Its leaves and flowers emit a very heavy resinous odour. This tree is a native of the south of Europe and the north of Africa, and was introduced into this country about 1656: it is not however common. One of the finest specimens in Great Britain is growing in the Chelsea Botanic Garden. The Chian or Cyprus Turpentine is procured from the *Pistacia terebinthus*. The Mount-Atlas Mastich, or Turpentine-Tree (*P. atlantica*), is a deciduous tree, growing in Barbary, not far from Mount Atlas. It is also, with the last species, found in the island of Scio (Chios) and about Constantinople. When cut into, it yields a large quantity of resinous matter, very much resembling mastich. The Moors eat the fruit as they do that of the date. The Mastich-Tree (*P. lentiscus*) is evergreen, attains a height of about 20 feet, and is a native of the coasts of the Mediterranean. The Pistachia-Nut Tree (*P. vera*) attains a height of about 20 feet, and is a native of Syria. It yields the Pistachia-Nut, and for this purpose it is cultivated in the south of France and Italy.

TURPI'NIA, a small genus of trees of the natural family of *Celastrineæ*, named in honour of M. Turpin. It is one of the genera common to the West Indies, India, and the neighbourhood of Canton—the *Dalrymplea* of Dr. Roxburgh having been found not to differ from the *Turpinia* of Ventenat.

TURQUOISE. This mineral occurs in botryoidal masses; it has a greenish-blue colour, and is usually opaque. It is found in alluvial clay in Persia. It consists of phosphoric acid, 31; alumina, 45; oxide of copper, 3.75; oxide of iron, 1.25; water, 19.

TURRÆA, a genus of plants of the natural family of *Meliaceæ*, named in honour of an Italian botanist, G. Turra of Padua, who died in 1607. Many of the species are highly ornamental, forming trees or shrubs in the interior of the Cape of Good Hope, in Madagascar, the Mauritius, and in the eastern parts of India.

TURRET (from the Latin *turris*) is used as the diminutive of tower, and denotes that what is so described is small in comparison with the main structure, of which it forms a part. Turrets are frequently attached to one or more of the angles of a tower, and contain a winding stair leading to the roof of the tower. Sometimes they are formed on the upper part only of a building.

TURRIFF. [ABERDEENSHIRE.]

TURRILITES, De Montfort's name for a genus of *Testaceous Polythalamacea*, occurring in a fossil state in the cretaceous formations. Mr. Sowerby ('Min. Conch.,' vol. i., page 81) gives the generic character thus:—Shell spiral, turreted, chambered; the turns contiguous, all visible: chambers divided by sinuous septa, pierced in their disks; aperture round.

As far as we know, nearly all the species are sinistrorsal; the septa have generally the sinuosities of ammonites, and the siphuncle is described by Mr. Sowerby as situated near the upper (external) part of the whorls. The cavity beyond the last chamber was very large, as in *Nautilus*, and probably enclosed the greater part of the animal, so that the shell was external. The British species (*T. costatus*, *T. tuberculatus*, *T. Bergeri*, *T. undulatus*, *T. obliquus*, of 'Min. Conchology') belong to the chalk and green-sand, and these appear to be the strata which enclose the same and other species in France and other countries.

The relations of *Turrilites*, *Scaphites*, *Baculites*, and *Hamites* to *Ammonites* are very obvious; and, as through *Goniatites* this great extinct group is certainly connected to the living and extinct *Nautili*, Mr. Owen has ventured to include them all in the *Tetrabranchiate Cephalopoda*, leaving Spirula and the Belemnites with *Sepia* and the *Dibranchiate* types.

TURRITELLA, a genus of pectinibranchiate gastropodous Mollusks, placed by Cuvier among the *Sabots*. [TURBINIDÆ.]

Shell, turriculated, pointed, rather delicate, generally striated in the longitudinal direction of the whorls of the spire, which are numerous; aperture rounded, entire, with the edges of the lip disunited above; the outer or right lip fragile.

Operculum, horny, its elements concentric.

Example, *Turritella rosea*, Quoy and Gaim. Shell elongate-conical, smooth, transversely very slightly furrowed, rosy, the whorls convex; the spire acute; the aperture subquadrate. Locality, New Zealand.

TURSELLI'NUS, HORA'TIUS, a learned Jesuit, whose real name was Torsellino. He was born at Rome in 1545. In 1579 he was appointed rector of the seminary of the Jesuits at Rome, which office he held till his death in 1599.

Tursellinus was one of the best Latin scholars that have ever lived, and his work on the Latin particles is very valuable. The last edition of it is by Hand, Leipzig, 1829, 8vo.

TURTLE. [Tortoises.]

TURTLE-DOVE (*Turtur communis, Columba Turtur*, Linn.). This elegant species of Dove is the *Tourterelle* of the French; *Tortora commune* of the Italians; and *Turtel Taube* of the Germans.

The Turtle-Dove is extensively spread over Europe and Asia, appearing to be everywhere migratory; Africa probably affording it a winter retreat. 'These birds,' says Mr. Yarrell, 'arrive in England about the end of April or the beginning of May, and are rather more numerous in the south-eastern, southern, and midland counties than in those which are farther north. Their appearance is observed and hailed each returning spring, as denoting the season of buds and flowers; and, as emblems of serenity and peace, their mournfully plaintive notes give pleasure. They frequent woods, fir plantations, and high thick hedges dividing arable land. They make a thin, almost transparent, platform nest, eight or ten feet above the ground, in the forked branch of an oak, on a fir-tree, or near the top of a thick and tall bush. Upon this nest the female deposits two eggs about the middle of June, according to the observations of Mr. Jenyns. The eggs are white, rather pointed at one end, one inch two lines and a half long, by ten lines in width. The parent birds sit by turns, the male occasionally also feeding his mate during incubation, and both afterwards mutually labouring for the support of the young. In this country they are considered as producing but one brood in the season, but in the south of France these birds are known to have a second pair of young. Their food is grain, particularly wheat, and they are constant visitors to the wheat-field while the corn is growing, and to pea-fields; they also feed on rape and other small seeds. In the autumn they fly in small parties of ten or twelve birds, and leave this country about the end of August, and sometimes as late as the end of September, particularly in those seasons when our harvest is backward. I have several times killed both adult birds and the young of the year when out partridge-shooting in Hertfordshire; but I have observed that these birds are more numerous in the thickly-wooded parts of the middle of the county of Kent than elsewhere.'

TUSCAN ARCHITECTURE. [Civil Architecture.]

TUSCALOOSA. [Alabama.]

TUSCANS. [Etruria.]

TUSCANY (*Toscana*), a division of central Italy, with the title of grand-duchy, situated S. of the main ridge of the Apennines, and between it and the Mediterranean Sea. It is bounded W. by the sea and the territories of the duke of Modena, N. by Modena and the Papal provinces of Bologna and Romagna; E. by the Papal provinces of Urbino and Perugia; and S. by the province of Viterbo, and partly by the sea.

About the end of 1847 the outlying territories of Fivizzano and Pontremoli were ceded with some other districts to Modena and Parma respectively; and Tuscany obtained the duchy of Lucca, so that it is now a compact territory with an area of 8517 square miles, and a population of 1,693,597. A part of the valley of the upper Tiber belongs to Tuscany; and also a mountainous tract on the northern slope of the Apennines, containing the sources and upper course of a number of streams which flow towards the Adriatic. With this last exception, the waters of the grand-duchy flow southwards to the Mediterranean. The principal rivers are, beginning from the north—the Serchio, which flows through the duchy of Lucca; the Arno, which, with its numerous affluents, including the Chiana, drains more than one-third of Tuscany; the Cecina, which drains the valley of the same name; the Ombrone, the principal river of the province of Siena; the Albegna, which flows through the southern part of the Maremme, and enters the sea N. of Monte Argentaro; and the Fiora, which drains the most southern part of Tuscany, and then enters the Papal territory.

The surface of Tuscany presents four different regions:—1. The highlands of the Apennines. 2. The hilly tract, which forms the greater part of the province of Siena, between the valley of the Chiana on one side and that of the Arno on the other, and which slopes on the south-west towards the lowlands of the Maremme. The Ombrone forms the principal drain of this extensive plateau, which is intersected by rather high ridges, some of which are ramifications of the great Apennine chain, whilst others, like Monte Amiata and the mountain of Radicofani, are of volcanic formation. 3. The great valley of the Arno, with the lateral valleys of the Chiana, Elsa, Era, and other affluents. This constitutes the finest, most productive, and most densely-inhabited part of Tuscany. 4. The maritime plains, or Maremme. A description of the surface of the country is given under Arno; Florence, Province of; Garfagnana; Maremme; Pisa, Province of; Siena, Province of.

About one-sixth part of Tuscany is planted with vines and olive-trees; another sixth is cultivated as arable land; nearly two-sixths are either forests or plantations of chestnut-trees, which afford food to the population of the mountains; and nearly as much again is pasture land. The most common way of letting land is on the 'metayer' system, by which the farmer finds half the seed and implements, and gives the owner half the produce

in kind. The landlord stocks the farm, and a valuation is given to the farmer, who is to make all good on leaving.

Tuscany does not grow corn enough for its own consumption. The principle articles of produce are—wine, oil, and silk. The other articles of native produce exported are—fruit of various sorts, lamb and kid skins, potash, timber, cork, juniper-berries, marble and alabaster, iron from Elba, borax, sulphur, alum, and anchovies, which are fished off the coast. Nearly the whole trade of Tuscany with other countries is carried on through the port of Leghorn. [Livorno.] Horned cattle are not very numerous; the sheep are reckoned at 600,000; most of the flocks migrate in the autumn from the highlands to pass the winter in the Maremme. The common horse is of an inferior breed. The asses are strong and fine. Pigs are reared in great numbers in the woods of the Maremme, where they feed upon acorns. A herd of about 200 camels is kept up on the grand-ducal farm of San Rossore near Pisa, and is said to have been perpetuated there ever since the time of the Crusades. Game of most kinds is abundant.

The mineral products are—iron, from the island of Elba, the ore of which is smelted and cast on the mainland, at Cecina, Valpiana, and Follonica; copper, lead, marble, sulphur, rock-salt, alabaster, and alum. Sea-salt is made chiefly in Elba.

The manufactures of Tuscany consist of woollen, hempen, and linen cloths; woollen caps for the Levant; silk stuffs, paper, glass, leather, wax; coral, which is gathered on the coast of Barbary and worked at Leghorn; iron-ware, alabaster vases, and other ornaments, wrought at Volterra; china and delft ware. The straw-plat manufacture has declined greatly of late years.

The grand-duchy of Tuscany is divided into nine provinces:—Fiorentino, Pisano, Senese, Aretino, Pistojese, Grossetano, Livorno and the isle of Gorgona, Elba and the adjacent islands, and Lucca. Each province is administered by a provveditore, and subdivided into districts and communes. Each commune is presided over by a municipal officer styled gonfaloniere. For the judicial administration there is in every commune a magistrate, called in some places Vicario, and in others Podestà; there are primary courts for civil and criminal affairs, in each of the principal towns; four courts of appeal, called Ruote, at Florence, Siena, Arezzo, and Pisa; and lastly, a court of appeal at Florence, which watches over the whole judiciary administration. In commercial affairs there are tribunals of commerce at Florence and Leghorn. The chief board of police for the whole grand-duchy is at Florence; there are commissaries of police in the principal towns, and a body of 'Sbirri,' or police force, scattered about various points of the country.

The land and sea forces in 1850 amounted to 12,385 men, including the police. The navy consists of three brigs and two sloops of war. The estimated revenue of 1850 was 29,827,700 lire, derived chiefly from customs, land-tax, income-tax, stamps, government monopoly of salt and tobacco, lotteries, and crown demesnes: the total estimated expenditure was 35,331,560 lire. (The value of the lira is about 7½*d.*) The expenditure of the communes is provided for by their own self-taxation. Provisions on entering the walled towns pay a duty at the gates, as in France. A railroad runs from Florence through Empoli and Pontedera to Pisa, where it is joined by two other lines, one of which runs to Leghorn, the other to Lucca and San Salvatore. There is also a short line from Florence to Prato, and a branch line from Empoli to Sienna.

The grand-duke of Tuscany is an independent and absolute sovereign; he governs according to the established laws, customs, and precedents, and is assisted by a council of state, composed of his secretaries of state, and other honorary members. The Grand-Duke granted a constitution to his subjects, Feb. 15, 1848, guaranteeing personal liberty, liberty of the press, a free toleration of all sects, and establishing a representative form of government, which was to consist of two chambers—a senate composed of life members named by the grand-duke, and a chamber of deputies consisting of 86 members to be elected by the people. The chambers met on the 26th of June following. A successful republican revolt broke out at Leghorn (Sept. 3), headed by Guerazzi, a member of the chamber of deputies, who was soon after joined by Professor Montanelli of Pisa. The Grand-Duke was forced to accept a ministry (Oct. 27) including the two leaders of the revolution. On the 1st of February, 1849, the Grand-Duke retired from Florence to Siena, where, being joined by his family, he hastened to San-Stefano, a town on the coast, whence he embarked for Gaeta. After his flight a provisional government was proclaimed, consisting of Guerazzi, Montanelli, and Mazzoni; the constitution was abolished (Feb. 15), and a constituent assembly called, which (March 27) named Guerazzi dictator. But a revolution in favour of the Grand-Duke took place at Florence, (April 12), and a provisional ministry was formed, which was confirmed by the Grand-Duke's commissary extraordinary early in May. An Austrian army under General D'Aspre immediately after took military possession of the grand-duchy with the exception of Leghorn, which however was attacked on the 12th of May, and taken next day. The Grand-Dukel anded at Viareggio on his return to his states, July 23. By a convention dated April 22, 1850, the Austrian army of occupation numbers 10,000 men; and by a decree dated Sept. 21, 1850, the Grand-Duke resumed all the powers of the state.

The Roman Catholic is the established religion of Tuscany, and is professed by all Tuscan subjects, with the exception of about 7000 Jews, who reside at Leghorn and Florence. Foreigners of other Christian communions are allowed the exercise of their respective worship in chapels for the purpose at Leghorn and Florence, as well as their own burying-grounds. The church establishment of Tuscany consists of three archbishops (Florence, Pisa, and Siena) and 17 bishops. The income of most of the sees varies between 4000 and 7000 dollars; a few have only 2000 dollars. The regular clergy number about 9000, with an aggregate income of about 80,000*l.* sterling, derived

from houses and land. There are besides about 2500 monks distributed among 133 convents, about 3800 nuns in 69 nunneries, and 54 conservatories, or houses for female education attached to convents, under the direction of nuns; most of these establishments are well and even richly endowed, especially the conservatories. The profession of the law is in high esteem. The medical profession is also well studied; and the universities of Pisa and Siena, and the Medical and Surgical College annexed to the great hospital of Santa Maria Nuova at Florence, give excellent instruction to students. For purposes of general education there are in most of the large towns grammar-schools, which are kept by the Fathers Scholarum Piarum. The instruction is gratuitous. There are, besides, schools for boarders, as well as for day students, mostly under the direction of the Fathers Scholarum Piarum, who are the chief instructors of the Tuscan youth, and who deserve great praise for their zeal and ability. In every diocese there is at least one clerical seminary for those who study for the church, and several of them also admit day students. Lastly, for higher instruction there are the two universities of Pisa and Siena, each of which has faculties of divinity, jurisprudence, medicine and surgery, and mathematical and physical science. Gratuitous elementary schools exist in almost every commune, and are supported from the local taxation. Among the eminent special schools are the Academy of the Fine Arts and the Medical College of Santa Maria Nuova, both of which are in Florence. The education of youths of noble families is generally pursued at the colleges for the nobility, the principal of which is the Collegio Tolomei at Siena, directed by the Fathers Scholarum Piarum. Charitable institutions are numerous: there are about 35 hospitals for the infirm, 15 foundling hospitals, 5 orphan asylums, 12 monti-di-pietà, 10 savings-banks, 14 infant asylums, and numerous societies of charitable persons who assist the sick poor. The Jewish population at Leghorn have their own charitable institutions and schools.

Foreigners in Tuscany are placed upon the same footing as natives; they can purchase, inherit, and dispose of property without any restrictions.

History of Tuscany.—A sketch of the ancient history of the country is given under ETRURIA. After the fall of the Western Empire, Etruria became a province of the kingdom of the Goths, and afterwards of the Longobards, under the name of Tuscia, Tusci having been used by the Romans as synonymous with Etrusci. Under the Longobards it was divided into 'Tuscia Regni,' which included the duchies of Luca, Florence, and Clusium, and 'Tuscia Longobardorum,' which comprised the duchy of Castro, the present papal province of Viterbo. Gradually the name of Tuscia, or Tuscany, became restricted to the former division. Under Charlemagne and his successors Tuscany was administered by marquises. The series of marquises ended with Matilda, who died without issue in 1115. Though the emperors of Germany as kings of Italy continued for a time to appoint imperial vicars in Tuscany, their authority was little more than nominal, as the republics of Florence, Pisa, Siena, Arezzo, Pistoja, and Lucca, divided the country among them. Florence, having conquered Pisa [PISA], became the predominant power in Tuscany. After the fall of the republic in 1530, Charles V. appointed Alessandro de' Medici, an illegitimate son of Lorenzo, duke of Urbino, to be Duke of Florence. Alessandro proved an unprincipled, cruel, and dissolute tyrant. He was murdered by his cousin Lorenzino de' Medici, in Jan., 1537; but the party of the Medici, headed by Guicciardini, the historian, proclaimed Cosmo de' Medici, son of Giovanni 'delle bande Nere.' Cosmo was the founder of the grand-ducal dynasty of Tuscany, having united Siena to his other dominions. [COSMO I.]

The grand-ducal dynasty of Medici ended with Gian Gastone, who died in 1737. He was succeeded by Francis, duke of Lorraine and Bar. Francis married the Archduchess Maria Theresa, daughter and heiress of Charles VI. of Austria, emperor of Germany. Tuscany was governed by a regency, while Francis and Maria Theresa resided chiefly at Vienna.

Francis II. of Tuscany and I. of Germany died in 1765. His eldest son Joseph succeeded him as emperor of Germany, and his second son Leopold as grand-duke of Tuscany. Leopold having succeeded his brother Joseph II. in 1790 as emperor of Germany and sovereign of the Austrian dominions [LEOPOLD II.], and his eldest son Francis being thereby hereditary prince of the Austrian monarchy, the grand-ducal crown of Tuscany devolved upon his second son Ferdinand III. Ferdinand was obliged to renounce his government in 1801, by Napoleon, who gave it to the hereditary prince of Parma, but the Congress of Vienna in 1815 confirmed the possession of Tuscany to Ferdinand and his successors. Ferdinand III. died in 1824, and was succeeded by his son Leopold II., the present Grand-Duke.

(Serristori, *Statistica dell' Italia: Almanacco della Toscana.*)

TUSCULUM. [FRASCATI.]

TUSSER, THOMAS, was born at Rivenhall, near Witham, in Essex, probably about 1515. He was taught singing at an early age, and became a chorister in the collegiate chapel of Wallingford Castle, whence he was removed by impressment, for the service of the royal chapel. He was next admitted into St. Paul's, then went to Eton, and subsequently to Cambridge; after which he returned to court, and appears to have been a retainer in the family of William Lord Paget. When he had spent ten years at court, probably engaged in his musical capacity, he married, and became a farmer at Katwade, now Cattiwade, in Suffolk, where he wrote 'A Hundreth Good Pointes of Husbandrie,' the first edition of which appeared in 1557. After several other changes of residence, and marrying a second time, Tusser returned to London, whence, about 1574, he went to Trinity College, Cambridge, in order to escape from the plague. He is supposed to have returned to London, where he died about 1580, or between that year and 1585.

After passing through several editions, his work appeared in an enlarged form in 1573, and was many times reprinted with various alterations. The life of the author, which forms by no means the least amusing part of the book, appears to have been first printed with the edition of 1573.

TUSSILA'GO, a genus of plants belonging to the natural order *Compositæ*. The species are natives of Europe and America. Two are natives of Great Britain.

T. Farfara, Common Coltsfoot, is a native of moist, chalky, clayey situations throughout Europe. Its flowers come up in March and April, and have often disappeared before the leaves ascend from the ground. This plant from the earliest times has had a great reputation for curing coughs. The part used is the leaves, which are very large, and clothed on the under surface with a dense white cottony down. They are mucilaginous, astringent, and slightly bitter, and are used either in infusion or decoction, or dried and smoked like tobacco. The plant is not often used now by the medical practitioner.

T. Petasites, Common Butter-Bur, is very abundant in wet meadows and by river sides. This plant produces the largest leaves of any in Great Britain, sometimes measuring three feet broad.

T. fragrans, Fragrant Coltsfoot, blossoms early, and has a sweet scent, and has found very generally a place in gardens. It is a desirable flower where bees are kept.

TUTBURY. [Staffordshire.]

TUTENAG, an alloy used in China in the manufacture of the *Gong*. It is white, resembling silver in appearance, and is very sonorous when struck. It consists of copper 40, zinc 25, nickel 32, iron 3. It is susceptible of a fine polish, and does not readily tarnish. At common temperatures, and even at a red heat, it is malleable, but when heated to whiteness it is rendered brittle. The composition is nearly the same as that of German Silver.

TU'TILO, a monk of the convent of St. Gall in Switzerland, and Notker, another monk of the same convent, are said to have been the most celebrated painters, sculptors, and goldworkers of their time in Germany. Tutilo was a universal genius—artist, musician, poet, orator, and statesman. He is said to have died in 896, and this date is twice repeated by Fiorillo; yet he and other writers call him a monk of the tenth century. Lessing and others have supposed that Tutilo, or Tuotilo, as his name is also written, and the Theophilus Presbyter who wrote a treatise in Latin upon oil-painting and other arts in or about the 10th century, were the same person. There are manuscripts of this old treatise, more or less complete, at Wolfenbüttel, Leipzig, Paris, and at Cambridge. An entire copy of the Wolfenbüttel MS. was printed in 1781 at Brunswick, in the sixth number of Lessing's 'Beiträge zur Geschichte und Litteratur.'

TUTOR. By the Roman law a male under the age of 14, and a female under the age of 12, were called Impúberes. A male who was impubes was incapable of doing any legal act by which he might be injured; his property was under the care of a tutor, who was so called from his office of defending or protecting (tuendo) the impubes in the transactions which were necessary for the administration of his property. The office of the tutor was tutéla; and the impubes, who with respect to his tutor was called pupillus, was said to be in tutéla, in tutelage. The tutor's business was to manage the property of his pupillus, and to add to his acts the legal sanction (auctoritas). When the pupillus attained the age of puberty, he had the capacity of contracting marriage, and of doing other legal acts, and was freed from the control of his tutor. But though the law gave full legal capacity to the pupillus on his attaining puberty, it still gave him some further protection until he was 25 years of age. [Curator.]

A father could appoint by testament a tutor for his male children who were impuberes and in his power; he could also appoint a tutor for females who were in his power, even if they had attained puberty. A father could also appoint tutors in some other cases. If a testator appointed no tutor, the tutela was given to the nearest agnáti by the Twelve Tables: such tutores were legitimi. When there was no person appointed tutor, and no legitimus tutor existed, a tutor was appointed for persons at Rome under the provisions of a Lex Atilia, and for persons in the provinces under the provisions of a Lex Julia et Titia.

TUTSAN, the name of a plant indigenous to Great Britain, the *Hypericum androsæmum* of Linnæus. The English name Tutsan is derived from *toute saine*, French, a term employed on account of its bruised berries having been employed as an application to recent wounds. Tutsan is found in damp places throughout Europe, but is not an abundant plant. In Great Britain its distribution is very local. Its occurs abundantly in some parts of Norfolk and Hertfordshire, and is not unfrequent in Ireland and the west of Scotland.

TUXFORD. [Nottinghamshire.]

TUY. [Galicia.]

TWEDDELL, JOHN, was born June 1, 1769, at Threepwood near Hexham in Northumberland, where his father, Francis Tweddell, was a magistrate. He studied for some time under Dr. Samuel Parr, was sent to Cambridge, and in 1792 was elected a fellow of Trinity College. His 'Prolusiones Juveniles,' which he published the year after (1793), show the extent and versatility of his powers. He next became a member of the Middle Temple, but disliking the study of the law, he resolved to travel, with a view to a diplomatic career. He left England Sept. 24, 1795, and after visiting several parts of Europe and Asia, took up his residence at Athens. With the most ardent zeal he explored and described the remains of ancient art and architecture, and employed a French artist of the name of Preaux in making drawings for him. In the midst of these pursuits he died, July 25, 1799. After his death his friends endeavoured to get his effects, MSS. (which included a diary), and drawings over to England. Many were collected, but they afterwards disappeared in a very mysterious manner,

and have never been recovered. The only memorial which remains of his travels is a number of letters addressed to his friends in England, which were published, with a memoir, by his brother the Rev. Robt. Tweddell, London, 1815, 4to.

TWEED. [PEEBLESHIRE.]

TWELVE TABLES. [ROMAN LAW.]

TWER, a government of Great Russia, is bounded N. by Novgorod, E. by Yaroslav and Vladimir, S. by Moscow and Smolensk, and W. by Pskov. The area is 25,886 square miles, and the population in 1846 was 1,327,700. This government, especially in the northern part, is an elevated table-land; there are no mountains, for the Wolkonsky forest, which covers the greater part of the circle of Ostuschkow, is but a range of hills; in these however the Volga and many large rivers have their source. Besides the Volga the chief rivers are the Dwina, the Wäsuga, the Twerza, the Sestra, the Soscha, and the Mologa. The canal of Wyschnei-Wolotschok unites the Volga and the Neva, thus effecting a communication between the Baltic and the Caspian. The most considerable lake is the Sseliger, which is 24 miles long and 4 wide. The climate is healthy. The weather however is very variable. The rivers generally freeze by the beginning of December and thaw towards the end of March. Cattle breeding and agriculture are the general occupations of the inhabitants: the soil is poor and the produce is scarcely more than enough for the home consumption. Rye, barley, oats, and a little wheat are produced. Much flax and hemp are grown. Garden vegetables are plentiful. Fruit is scarce. Timber is very fine and abundant. There are many bears, wolves, foxes, badgers, and martens. Fish are very plentiful. Many hands are employed in the country in the saw-mills, brick-kilns, boat-building, and in land and water carriage. The excellent inland navigation affords the greatest facilities for exporting the produce of the government, and favours the transit trade between the southern provinces and the Baltic.

Twer, the capital of the government, situated in 56° 52′ N. lat., 35° 48′ E. long., stands on the right bank of the Volga, over which there is a bridge of boats in the summer, and which is here joined by the Twerza and the Tmaka. Twer is merely surrounded with palisades, which are closed by barriers, and consists of three parts: the fortress lying between the Volga and the Tmaka, which is surrounded with a rampart; the city, which is divided by the rivers into four parts, united by three bridges; and a suburb. The city, which is regularly and well built, has a cathedral, 28 churches, 2 convents, a bazar, a palace, a theatre, a foundling asylum, a hospital, a gymnasium, and an ecclesiastical seminary. Twer has 24,000 inhabitants, who manufacture linen, leather, hardware, and candles, and carry on an extensive trade.

(Hassel, *Handbuch;* Stein, *Lexicon;* Schnitzler, *La Russie, la Pologne, et la Finlande.*)

TWICKENHAM. [MIDDLESEX.]

TWILIGHT, the name given to the light which remains after the sun has set, or which is seen immediately before it rises. The twilight, which is an effect of the light reflected from the higher strata of the atmosphere, begins or ends at the time when the sun is at a certain depression below the horizon, the depression depending upon the state of the atmosphere for the time being. In the fogs of winter darkness comes on almost immediately after sunset, while on a clear summer evening the broad light of day will continue for more than an hour, in our latitude. In tropical climates the sun descends and ascends almost perpendicularly to the horizon, and therefore his apparent motion is so rapid that the interval between light and darkness is very short; whereas, in higher latitudes, he approaches more obliquely to the horizon, and moves more obliquely to it after he has set. This causes his vertical descent and ascent to be more slowly made, and thus the duration of twilight is increased: the increase is apparently greater in consequence of the pupil of the eye having more time to accommodate itself to the diminished quantity of light.

TWINING, THOMAS, was the only son of a tea-merchant, and was born in London in 1734. He was sent to Sidney Sussex College, Cambridge, where he distinguished himself not only as a scholar, but by his practical as well as theoretical knowledge of music: he was an able performer on the harpsichord, the organ, and the violin, and few persons knew more about the history and science of music. In 1760 he took his degree of B.A. In 1768 he became rector of White Notley, in Essex, to which, in 1770, the living of St. Mary, Colchester, was added. To this latter appointment he was presented by Dr. Lowth, then bishop of London. He devoted himself to his parochial duties and to study, until his death, on the 6th of August, 1804.

Twining was a man of considerable learning and of great taste in the arts. In the performance of his clerical duties he was most conscientious. The only work that Twining published is a translation of Aristotle's 'Poetics,' which is reckoned one of the best English translations of ancient writers. It was published under the title 'Aristotle's Treatise on Poetry translated, with Notes on the Translation and on the Original; and two Dissertations on Poetical and Musical Imitation,' London, 1789, 4to. A second edition, with some improvements and additions by the author, was edited by his nephew, Daniel Twining, London, 1812, 2 vols. 8vo.

TWISS, RICHARD, an English tourist, who died in London at an advanced age March 5, 1821. He wrote—'Travels through Portugal and Spain in 1772 and 1773–4,' London, 1775; 'A Tour in Ireland in 1775-6,' London, 1776; 'The Game of Chess; being a compilation of Anecdotes and Quotations relative to the Game of Chess,' 8vo., London, 1787; 'A Trip to Paris in July and August, 1792,' 8vo., London, 1793; 'Miscellanies,' 8vo., London, 1805.

TYCHO BRAHE. [BRAHE.]

TYCHSEN, OLAUS GERHARD, was born at Tondern in Schleswig, December 14, 1734. Up to the age of seventeen he was taught at the grammar-school of his native town, after which he went to the gymnasium of Altona, where he

learned Hebrew. In 1756 he went to the university of Göttingen. In 1760 the university of Rostock was transferred to Bützow, and Tychsen was invited to be professor extraordinary of Oriental literature. Three years later he obtained the ordinary professorship in the same department. A part of the professors remained at Rostock on the transfer of the university to Bützow; but a re-union of the two parts was brought about at Rostock in 1789, and Tychsen was appointed chief librarian and keeper of the museum of Rostock, which offices he held until his death in 1815.

Tychsen was a man of extraordinary knowledge in his departments, and, with all his singularities and conceits, he promoted the study of Biblical and Eastern literature more than any man of his time. For some notices of his works, see the article in the 'Penny Cyclopædia.'

TYCHSEN, THOMAS CHRISTIAN, was born on the 8th of May, 1758, at Horsbyll in Schleswig. His first studies in theology and philology were at Kiel: he continued them from the year 1779 at Göttingen under Heyne. In 1784 he was appointed professor extraordinary of theology at Göttingen, and, four years later, ordinary professor in the philosophical faculty. He continued to labour here with unwearied activity until his death, Oct. 23, 1834. Tychsen wrote a great number of valuable papers on antiquarian and numismatic subjects. Among his greater works we may mention his manual of the history of the Jews, his edition of Q. Smyrnæus, and his 'Arabic Grammar.'

TYE, CHRISTOPHER, doctor in music, was, according to Fuller, born in Westminster, and educated in the King's Chapel. He was especially favoured by Henry VIII., and was musical instructor to Prince Edward, and probably the other children of that monarch. He was admitted Mus. Doc. at Cambridge, in 1545, and, ad eundem, at Oxford, three years after. In the reign of Queen Elizabeth he was organist to the Chapel-Royal, for which, Fuller tells us, he produced several 'excellent Services and Anthems, of four and five parts, which were used many years after his death.'

TYLO'PHORA, a genus of plants of the natural family of *Asclepiadeæ*. The species form twining herbs or under-shrubs. They are found in India, the Malayan Peninsula, Java, and New South Wales, and are not of any known use, with the exception of *T. asthmatica*, which is frequently employed in Hindustan as a substitute for ipecacuanha.

TYMPANUM. [Ear.]

TYNDALE, or TINDALE, WILLIAM, was born probably about 1477. His parentage is doubtful, but it is certain that he went to Oxford, and thence removed to Cambridge. He afterwards became tutor in a gentleman's family in Gloucestershire, where his attachment to the doctrines of the reformers placed him in so much danger that he came up to London. After preaching for some time in the church of St. Dunstan's-in-the-West, he was taken into the house of Humfrey Monmouth, one of the aldermen of the city, who kept him for half a year, and then settled upon him an annuity of ten pounds to enable him to live abroad. Tyndale proceeded first to Saxony, where he is stated to have conferred with Luther; after which he repaired to the Low Countries and settled at Antwerp, as preacher to the English mercantile factory there. It was probably while resident here that he executed the greater part of his English translation of the New Testament. [Bible.] Tyndale's translation and his other works were repeatedly denounced by the English authorities, and he was at length seized, confined for a year and a half in a fortress near Brussels, at length brought to trial at Augsburg, and in 1534 condemned as guilty of heresy. Upon this sentence he was, says Foxe, 'brought forth to the place of execution, was there tied to the stake, and then strangled first by the hangman, and afterward with fire consumed.'

Reprints of Tyndale's translation of the New Testament have been printed, and his other works have been collated, together with those of Frith, by Thomas Russell, A.M., 3 vols. 8vo., London, 1831.

TYNEMOUTH. [Northumberland.]

TYPE-FOUNDING. In the article Printing a general view is given of the various steps in the invention of typography, or the art of printing from moveable types, and a brief notice of the individuals whose ingenuity contributed, more or less, to the perfection of the process of type-founding. Most of the early printers, in England as well as on the Continent, cut and cast their own types. It has since become a separate business.

The first and most important operation of a type-foundry is the formation of the punches, which are well-tempered pieces of steel, each of which bears on its face a single letter, formed with the greatest possible accuracy by filing, cutting, and punching the hollows with smaller punches. The face of the punch exactly resembles that of the finished type, the letter being reversed, and in high relief. The punch-cutter has to exercise great care and judgment for making the letter of precisely the right size, form, and thickness, so that it may range well with other letters of the same *Fount*, or set. When the punch is completed and hardened, it is struck into a piece of copper, which, when it has received the impression from the end of the punch, is called a *Matrix*, and forms a mould for the face of the type.

The *Mould* for casting the type consists of two halves, each of which is made of steel, and attached, for convenience of holding, to a piece of wood. The two halves of the mould are so formed that they may be instantaneously fitted together, leaving a square funnel-shaped opening at the top, by which the type-metal is poured into the mould to form the body of the type, with the matrix at the bottom to form the letter or face. The two halves of the mould are capable of adjustment to the varying widths of the letters. The type-metal is usually melted in a small cast-iron pot, set in brickwork with an enclosed fire under it, and is poured into the mould by a very small ladle. The caster then jerks the mould quickly

upwards by a peculiar motion of his arm, and thereby expels the air, and forces the fluid metal to enter the cavities of the matrix. Some founders use a small force-pump to aid this operation. When the metal is set, the caster removes the pressure of a long curved spring which is attached to the bottom of the mould, and thereby separates the matrix from the face of the type. The mould is then opened, and the type is removed by the application of a hook attached to the upper part of the mould.

When the types leave the caster, each of them has a small block of metal attached to the shank, or body of the type, being that which filled the throat or funnel of the mould. These are removed by a boy. The next operation is that of rubbing the flat sides of the types upon a piece of grit-stone. The types are then set up by boys in long rows or lines, and these are firmly secured in long frames, which hold them together while the dresser scrapes or polishes the flat surfaces which form the top and bottom of the body, and cuts a groove or channel along their lower ends by means of a small iron plane. While they are in the frame the types are also *bearded*, an operation which consists in planing away to a bevel the upper angle of the body at the feet of the letters. After dressing, the types are tied up in such lines as may be convenient, and the proportionate numbers of every type of which a fount consists are selected. All the types belonging to one fount are distinguished by one or more grooves or *nicks* across the lower edge or bottom face of the body, by which simple contrivance the compositor is enabled to pick up the types and place them all upright without looking at the letter. These nicks are formed by the insertion of one or more wires in the mould. Four casters and two boys can cast, break, and rub 2000 types in an hour.

The composition of type-metal greatly varies; the chief component however is lead, alloyed by ore or some of the following metals—iron, antimony, copper, brass, tin, and bismuth.

As the several letters of the alphabet are, in common printing, required in very different proportions, the number cast of each letter in a fount needs to be carefully regulated. The proportions vary in different languages, and in different kinds of work; but for ordinary English book-work they are about as follows:—

a	8,500	n	8,000	ff	400
b	1,600	o	8,000	fi	500
c	3,000	p	1,700	fl	200
d	4,400	q	500	ffi	150
e	12,000	r	6,200	ffl	100
f	2,500	s	8,000	æ	100
g	1,700	t	9,000	œ	60
h	6,400	u	3,400	,	4,500
i	8,000	v	1,200	;	800
j	400	w	2,000	:	600
k	800	x	400	.	2,000
l	4,000	y	2,000	'	700
m	3,000	z	200		

The names of the various founts, beginning with the smallest and ending with one of the largest used in book-printing, are—Diamond, Pearl, Ruby, Nonpareil, Minion, Brevier, Bourgeois, Long Primer, Small Pica, Pica, English, Great Primer.

TYPHA'CEÆ, a natural order of plants, belonging to Lindley's spadicose group of Monocotyledons. The order includes two genera—*Typha* and *Sparganium*. They are herbaceous plants, growing in marshes and ditches. The genus *Typha* is known by the male and female flowers being both seated on the same spike, the male flowers being uppermost. There are three species of this genus, inhabitants of the temperate parts of the globe, and all are found in Great Britain. *T. latifolia*, Great Cat's-Tail or Reed-Mace, is a very handsome aquatic, and grows abundantly in damp marshy places. The leaves are three feet in length and an inch in width. When the densely-crowded spike is brushed and a lighted candle applied near it, a sudden flash is produced. This arises from the firing of the pollen that is diffused in the air. *T. angustifolia*, Lesser Cat's-Tail or Reed-Mace, is less frequent than the last species, but is not uncommon in the neighbourhood of London. *T. minor*, Dwarf Cat's-Tail or Reed-Mace, is found in the south of Germany and Switzerland. Kock calls it *T. minima*.

TYPHLOPHTHALMES, the name by which MM. Duméril and Bibron designate the last family of *Scincoidians*, comprehending those *Saurians* which are completely blind, or whose eyes are so small that they do not exist, so to speak, excepting in the rudimentary state, and entirely covered with skin, through which they are not even to be distinguished, as they still may be in other Saurians, *Amphisbæna* for instance, above whose eye the skin passes without being divided into two lids, as in the *Saurophthalms*, or pierced circularly so as to leave the globe of the eye entirely naked, as in the *Ophiophthalms*.

Two genera are known, *Dibamus* and *Typhline*. The former is represented by the *Dibamus Novæ Guineæ*; the latter by the *Typhline Cuvieri*, which inhabits South Africa. [ACONTIAS.]

TYPHLOPS, Schneider's name for a genus of reptiles placed by Cuvier among the *Ophidians*, or Serpents, and thus characterised by him:—

Body covered with small imbricated scales, as in the *Orvets*, among which naturalists long arranged them; the muzzle advanced, furnished with plates, the tongue rather long and forked, the eye like a point, hardly visible through the skin, the vent nearly entirely at the extremity of the body; one lung four times greater than the other.

These, adds Cuvier, are small serpents similar in point of aspect to earth-worms, and species are found in the warm climates of both continents.

This group is allied to *Amphisbæna*, forming a link between this latter genus (one of the Glyptoderm subfamily of Cyclosaurian reptiles, according to Duméril and Bibron) and the true Snakes.

Mr. Gray retains Typhlops among the Saurian Reptiles, and places his family *Typhlopsidæ* between *Acontiadæ* and the *Geckotidæ*.

The *Acontiadæ*, according to his arrangement, comprise the genera *Nessia*, *Enesia*, *Acontias*, *Dibamus*, and *Typhline*.

TYPHO'NIUM, a genus of plants of the natural family of *Aroideæ*, including several species of *Arum* of Linnæus, Roxburgh, and other botanists. The species are all stemless herbs, indigenous to India. Of these *T. orixense* is described by Dr. Roxburgh by the name of *Arum orixense*, and as common in the shady mango-groves near Samulkota.

TYPHOON (Greek τυφῶν, a whirlwind) is a name frequently applied to a tropical storm: it is also given to the hot winds which occasionally blow with great violence in Africa, Syria, Arabia, and Persia; and which are felt, though rarely and with much-diminished force, in the southern parts of Italy and Spain. The Sirocco of Egypt and the coasts of the Mediterranean, the Simoom of Arabia, and the Harmattan of the coast of Guinea, are understood to be so many designations of the typhoon. The fatal effects which have been said to result, both from the masses of moving sand and from the supposed deleterious quality of the winds, are now considered as exaggerations: the inconveniences felt by men and animals during the continuance of the hurricane are chiefly such as arise from the heat and dryness of the air, and from the quantity of sand raised up into the air. [Samieli; Tornado.]

TYPHUS, a form of fever, in which low nervous symptoms predominate. The following are its principal features:—It has a slow and insidious origin, lasting from fourteen to twenty-eight days. It is attended during the principal part of its course with symptoms of depressed or exhausted nervous power, with feeble pulse, great muscular weakness, and low delirium. There is a dry, rough, dark tongue, black sordes on the teeth and gums, and general fœtor of the body. It is capable of being propagated by the contagious emanations from the person affected. This is the low nervous or typhoid fever of this country. [Fever; Synochus.]

TYRA'NNIO, a Greek grammarian, and a native of Ámisus in Pontus, was made prisoner by Lucullus during his campaign in Pontus, B.C. 72. He was carried to Rome by Lucullus, and given as a present to Muréna, who restored him to freedom. At Rome he occupied himself with teaching and study, and is said to have amassed a considerable fortune. He is also said to have been employed in arranging the library of Apéllico, which Sulla brought from Athens, and which contained most of the works of Aristotle and Theophrastus. He was intimate with Cicero, who employed him in arranging his library; and he gave lessons to Cicero's nephew. Strabo also mentions Tyrannio as one of his masters.

TYRANNY. [Tyrant.]

TYRANT. The words tyrant and tyranny come respectively from the Greek *tyrannos*, *tyrannis* (τύραννος, τυραννὶς) through the Latin. Tyrant is used by Heródotus and Thucýdides, to signify a person who possessed sovereign power and owed it to usurpation, or who derived it from a person who had obtained such power by usurpation, and who maintained it by force. Pisístratus, who usurped the supreme power at Athens, B.C. 560, was succeeded in it by his eldest son Hippias. A Greek tyrant who obtained sovereign power was a monarch in the proper sense of that term. If he acquired a power which was somewhat less than sovereign, he was not monarch; but in either case he would perhaps be called tyrannus; and accordingly the word does not express with accuracy the degree of political power, but it ratner expresses the mode of acquisition, or refers to its originally illegal origin. The word, as used by the older Greek writers, did not carry with it any notion of blame: it simply denoted a person possessed of such political power as above mentioned, whether he used it well or ill. Many so-called tyrants were popular, and were men of letters, and patrons of literature and art.

The Roman writers often use tyrannus as simply equivalent to king, especially the poets. Cicero couples dóminus and tyrannus, thereby intending to use tyrannus in a bad sense, which was perhaps the more common acceptation of the word among the Romans in his time. Trebellius Pollio has written the 'History of the Thirty Tyrants' who sprung up in the Roman Empire in the time of Gallienus and Valerian. These so-called tyrants were not more tyrannical, in the modern sense of the term, than many Roman emperors.

The use of the modern words tyrant, tyranny, tyrannical, has been as vague as that of most other political terms. The term tyrant is properly limited to the government of one man who is sovereign, and the popular application of the term expresses disapprobation of his conduct.

TYRANTS, THIRTY. [Thirty Tyrants.]

TYRE. [Tyrus.]

TYROL, a crownland of Austria, is bounded N. by Bavaria, E. by the archduchy of Austria and the kingdom of Illyria, S.E., S., and S.W. by Austrian Italy, and W. by Switzerland. It is divided from Italy on the S.W. by an uninterrupted chain of high mountains, that runs from the lake of Idro northwards to the immense mass of rocks which is crowned by the Ortler Spitz. North of this mass a lateral chain extending northwards separates Switzerland from Tyrol, and terminates on the banks of the Inn, at the Finstermünz pass; north of the Inn the boundary is formed by the Rhæticon range (a branch of the Septimer Alps, extending between the Inn and the Rhine), the Rhine, and the lake of Constanz. On the northern boundary also there are high mountains, but they do not constitute an uninterrupted chain, being broken by several streams which rise in Tyrol and flow northwards into the great plain of southern Germany. The eastern boundary is formed chiefly by the continuous ranges that separate the river basins of the Salza and Drau from those of the Inn and Eisach. The Carnic Alps separate Tyrol from Italy on the south-east.

Tyrol, with the exception of a comparatively small tract, is covered with high mountain-masses, on which a great number of summits rise above the snow-line and are surrounded by extensive glaciers. Level tracts, admitting of cultivation with the plough, are only found on the banks of the rivers, where they sometimes attain a width of a mile, and in a few places more, but they are usually not more than half a mile wide. All these tracts taken together do not cover one-tenth

of the surface of the country; nine-tenths are occupied by the higher and lower mountain-masses of the Alps.

The Tyrolese Alps form the eastern portion of the Rhætic Alps. The most elevated parts lie along the western boundary and in the great chain which runs through the country from west to east, dividing the waters that run northwards to the Danube, from those that flow southwards to the Adriatic, or eastwards to the Drau. The western chain S. of 46° 8′ probably does not exceed 7000 feet above the sea-level; but near 46° 8′ it rises in Monte Adamello to more than 11,000 feet, and from this summit to the Ortler Spitz (46° 30′) the general elevation of the range exceeds 9000 feet. The Ortler Spitz is the highest summit of the Rhætic Alps, being 12,855 feet above the sea. It is surrounded by other summits, and is always covered with snow.

The deep and wide valley of the Upper Etsch (Adige), called Vintschgau, separates the mountain-masses of the Ortler Spitz from the range which traverses Tyrol from west to east. This range is divided into two high and elevated mountain-masses, which are divided by a large and wide depression near 11° 30′ E. long., through which the road over the Brenner passes from Germany to Italy. The mountain-region west of this road consists of two extensive and very elevated mountain-masses, the Oetzler Ferner and the Winacher Ferner, which are connected by a high ridge. A considerable portion of the more western mass is always covered with snow; among these the highest peaks are Mount Gebatsch, 12,276 feet; the Similaun Spitz, 11,859 feet; and the Great Oetzthaler Ferner, 10,434 feet above the sea-level. This is one of the most broken portions of the Alps, and the snowy masses are only furrowed by two deep and very narrow valleys. The Winacher Ferner, as the more eastern mass is called, also rises above the snow-line, and several summits exceed 10,000 feet in height, among which are the Kitzkamp, the Winacher Ferner, the Winter Stuben, and the Bock Kögl. East of the Winacher mountains the range nowhere exceeds 7500 feet in height; and the road over the Brenner at its highest level (47° N. lat.) is only 4374 feet above the sea. This is the lowest mountain-road across the Alps, and has accordingly become the most frequented line of commercial intercourse between Germany and Italy. East of this road the Tyrolese Alps constitute an elevated ground running from west to east, which contains an almost uninterrupted series of snow-capped mountains. The highest summits appear to be the Schwarzenstein, the Drei Herrn Spitz, and the Gross Glockner, which stands where Austria, Illyria, and Tyrol meet, and rises to 12,438 feet above the sea.

To the north of the valley of the Inn extends another range, which contains the sources of the rivers Lech and Isar. The highest summits in this region are the Arlberg and the Great Solstein, which are respectively 10,200 and 9702 feet above the sea. West of the last-mentioned summit runs the road which leads from the Plain of Bavaria to Innsbruck.

The mountains on the south-eastern boundary extend from the Adige, N. of Verona, to the source of the Drau, where they turn E. and leave Tyrol. Very few summits of this extensive mountain-region reach the snow-line. The most elevated is Monte Marmolata, which rises to 11,500 feet above the sea-level. The connection between this range and the Eastern Tyrolese Alps is formed by a moderately elevated and narrow ridge, which occurs near 12° 12′ E. long., and is connected with the extensive snow-masses and glaciers S. of the Drei Hernn Spitz. Over this ridge runs the road which connects Tyrol with the rest of the Austrian Empire, and from which another road branches off to the southward at Tolbach, over the Pentelsteiner Pass, and by the valley of the Piave to Venice.

The road over Monte Stilvio, constructed by the Austrian government between 1820 and 1825 for the purpose of establishing a direct communication between Tyrol and the Valteline, passes N.W. of the Ortler Spitz, and its highest level is 9174 feet above the sea. It is the loftiest carriage-road in Europe: it is said to be now out of repair and to have been abandoned.

The largest rivers of Tyrol are the Inn [Austria] and the Adige, or Etsch. The Inn is navigable from about 20 miles above Innsbruck; the Adige from its junction with the Eisach at Botzen; but the navigation of both rivers is difficult, and frequently interrupted by their rapidity, especially after the melting of the snow in the mountains.

As a great portion of the country, probably one-tenth, is always covered with snow, whilst its most southern valleys are hardly 500 feet above the sea-level, the climate of Tyrol must differ greatly in different places. At Innsbruck the mean temperature of the winter is 30.5°, or nearly 8° less than at London; and that of the summer is 64°, or about 2½° more than at London. The mean annual temperature is 49°, or 1° less than at London. At Trent the mean annual temperature is 53°, or nearly 3° higher than at London. Owing to the great unevenness of the surface, the air is in continual motion, and a calm day is a rare occurrence. The southern winds are like the sirocco of Italy. They are most frequent towards the end of summer, and dissolve in a few hours an immense quantity of snow, which about that season begins to cover the less elevated mountains, and the volume of water thus conveyed to the rivers produces extensive inundations in some parts of the valleys.

The most fertile lands are in the valleys of the Inn and of the Adige. Wheat, rye, barley, and oats are cultivated. In some parts buckwheat is grown. Millet is also grown, but not extensively. Indian corn is the principal object of agriculture in the southern valleys, and potatoes are nearly as much cultivated as in the northern. Hops grow wild, and tobacco is cultivated to some extent in the southern valleys. Flax and hemp are grown. Fruit-trees abound in the southern valleys, and large quantities of fruits are exported to Bavaria. Near Trent are plantations of fig-trees, and at Roveredo chestnuts

are very common. In these parts are also plantations of olive-trees and mulberry-trees. A considerable quantity of silk is annually collected. On the banks of the Lago di Guarda are plantations of oranges. Wine is made in large quantities, and some sorts are very good, but they do not keep. Cattle are of middling size and numerous; horses are less in number and fit only for draught. Sheep and goats are very numerous; but pigs are not much kept. There are chamois, hares, marmots, and partridges, and some large birds of prey, especially eagles. Gold, silver, and copper are found; lead, iron, calamine, and coal mines are worked. There are productive mines of rock-salt near Hall, below Innsbruck. In the southern districts there is a valuable kind of white marble, which is much worked.

Though the inhabitants are extremely industrious, Tyrol is not a manufacturing country. The women spin flax, weave linen, knit caps and stockings, make baskets and straw hats; the only manufactures of any importance are carried on in the chief towns. The transit trade of Tyrol is considerable, and much facilitated by the admirable roads. Many of the inhabitants annually migrate as pedlars or hawkers. The Tyrolese have a remarkable talent for the fine arts. Education is widely extended; there are nearly 1600 schools, including 12 high schools, 36 schools of industry, and 12 schools of design. Besides these there are eight gymnasia, a lyceum, two seminaries, and a university at Innsbruck. The beneficent and charitable institutions are numerous and well conducted. The inhabitants are all Roman Catholics. In the southern districts of Tyrol the people resemble the Italians in language, manners, and dress; in the north they adhere to old German habits and speak the German language.

Tyrol formed part of Rhætia, and was subdued by the Romans in the reign of Augustus. After being ravaged by successive hordes of barbarians, it was divided into several petty lordships, subject to the dukes of Bavaria. In the 12th century, on the fall of the House of Guelph, the Tyrolese became immediate subjects of the Empire, and the petty lordships were absorbed under two heads: the two families being united by marriage, the country was governed by one sovereign, the last of whom dying in 1335, left one daughter Margaret Maultasche, who made over her dominions to her cousins the dukes of Austria. By Austria it was held till the peace of Presburg, in 1805, by which it fell to Bavaria. Attached as the people were to the House of Austria, and to their constitution, which was remarkably free, they were dissatisfied with the change of masters; and when the war between France and Austria again broke out in 1809, the whole province rose in arms under Andreas Hofer, but the great disasters of Austria left them without support, and the country was again occupied by the French and Bavarians, in whose possession it remained till 1814, when to the great joy of the people, they were restored to the dominion of Austria, and reinstated in all their ancient privileges. By the new constitution of the Austrian empire, the crownland of Tyrol has a diet consisting of 88 members, which holds its sittings at Innsbruck.

The Tyrol forms 4 circles, which with their areas and population are as follows:—

Circles.	Area in sq. m.	Pop. in 1840.
Innsbruck . .	4,232	219,078
Brixen . . .	3,509	225,282
Trient, or Trento	2,371	317,410
Vorarlberg . .	978	105,408
Total . .	11,090	867,178

The circle of Innsbruck comprises the Tyrolese part of the basin of the Inn. Its chief towns are—INNSBRUCK: *Kuffstein*, a small fortified place of only 1400 inhabitants, near where the Inn enters Bavaria: *Landeck*, a village on the Inn at the mouth of the Trofana: *Imst*, a town of 3000 inhabitants, 30 miles W. from Innsbruck, and formerly famous for its canaries: and *Schwaz*, a place of some trade, and with a population of 3000, about 16 miles E. from Innsbruck, on the right bank of the Inn.

The circle of Brixen includes the Puster-thal or valley of the Rienz, part of the basin of the Drau, and the basins of the Eisach and upper Adige. The chief towns of the circle are—BOTZEN: *Meran*, which stands at the junction of the Passeyer with the Adige, and has two monasteries, a gymnasium, and 2300 inhabitants; the town was formerly the capital of Tyrol; there are many old castles in its neighbourhood: *Brunecken*, a small place of 1600 inhabitants, in the valley of the Rienz, a feeder of the Eisach: *Lienz*, which is situated in the Puster-thal on the Drau, and has a gymnasium, some iron-foundries, and 2000 inhabitants: and *Brixen*, an episcopal town, which stands at the junction of the Rienz and the Eisach, and has a gymnasium, a theological seminary, and 3600 inhabitants, who are engaged in agriculture and in the transit trade.

The circle of Trient comprises the whole of the crownland, south of the circle of Brixen. Its chief town *Trient, Trento*, or *Trent*, is situated on the Adige, in a beautiful and fertile valley surrounded by high mountains. The houses are very high, with flat roofs, the streets tolerably wide and well paved with broad flat pavement for pedestrians. Of the 13 churches the most remarkable is the cathedral, a large edifice in the old Greek style, entirely of marble, which was begun in the 10th and finished in the 16th century. The church of Santa Maria Maggiore, built entirely of red marble, is memorable as having been the place in which the Council of Trent held its sittings from 1545 till 1562. Trent is the residence of a bishop; it has 12,000 inhabitants, whose occupations are the silk manufacture and the cultivation of the vine. There are in the city extensive sugar-refineries, a large imperial tobacco-manufactory, and many distilleries of brandy and spirits of wine. The other towns of the circle are—*Borgo*, which is situated 16 miles E. from Trent on the Brenta, on the great road from Trent to Venice, and has a popu-

lation of 2200: and *Roveredo*, which is 14 miles S. from Trent on the Leno, near the left bank of the Adige, and has 7600 inhabitants. This town has many handsome houses, mostly built of marble; the new street, Corso Nuovo, in particular is adorned with fine edifices; the theatre stands at one extremity of it. The castle, which is surrounded with high walls, and the church of Santa Maria del Carmine are worthy of notice. Roveredo has a gymnasium, a public library, and some charitable institutions. The inhabitants manufacture silk, leather, and tobacco, and have a considerable trade in silk and southern products.

The circle of *Vorarlberg* occupies the north-western part of Tyrol. It is drained by the Rhine, the Ill, and the Lech, a feeder of the Danube. The chief town, *Bregenz*, a well-built place of 2260 inhabitants on the eastern shore of the lake of Constanz, near the mouth of the Aach, is a place of considerable trade; wooden houses, straw-plat, timber, and vine poles are exported. Steamboats on the lake of Constanz touch at Bregenz. The other towns are—*Bludenz*, S. of Bregenz, on the Ill, with a castle and 2000 inhabitants: and *Feldkirch*, further down the Ill, which has a gymnasium and a population of about 2000. The Vorarlberg takes its name from its position in front of the Arlberg, looking from Switzerland; Austria generally keeps a large force in this circle.

(*Die Oesterreichische National Encyclopädie;* R. v. Jenny, *Handbuch für Reisende durch Oesterreich; Almanach de Gotha pour* 1851.)

TYRONE, an inland county in the province of Ulster, in Ireland, is bounded N. and N.E. by the county of Londonderry, E. by Lough Neagh, S.E. by the county of Armagh, S. by Monaghan, S.W. by Fermanagh, and W. and N.W. by Donegal. Its greatest length E. to W. is 57 miles; its greatest breadth N. to S. is 48 miles. The county lies between 54° 19′ and 54° 57′ N. lat., and between 6° 35′ and 7° 56′ W. long. The area is 1260 square miles. The population in 1841 was 312,956.

Surface, Geology, and Rivers.—This county lies, for the most part, between the two mountainous districts which cross Ulster from east to west. The northernmost of these districts (that of Antrim, Londonderry, and Donegal) encroaches upon the northern border; and the southernmost (that of Down, Armagh, Monaghan, and Fermanagh) encroaches on the southern border. Outlying groups of mountains occupy portions of the intermediate district, especially on the west, where they extend nearly across the county. Another group, connecting the two great mountain-districts, crosses the county a little to the eastward of the centre, and divides the lower ground, which occupies most of the central and eastern parts of the county, into two parts—the plain or basin of Omagh in the centre, and the plain of Lough Neagh on the east. [Neagh, Lough.] The highest mountains are Slievh Sawel, 2236 feet, and Mullagh Clogher, 2083 feet.

The plain of Lough Neagh rises gradually from the shore of the lough westward towards the mountains which separate it from the plain of Omagh. The part of the plain adjacent to the lough is occupied by tertiary formations, consisting of beds of white, brown, and greenish-blue clay, alternating with white and gray sand: they have been bored in some places to the depth of 294 feet without reaching the subjacent formations. To the north-west of the tertiary beds, the secondary formations, chalk, green-sand, and lias, crop out, being covered in places by masses of tabular trap. These are succeeded by the red marl or new red sandstone, which on the south-west immediately succeeds the tertiary beds. Between Dungannon and Stewartstown is a small coal-field, which contains more beds of workable coal than any other in Ireland. Some of the coal is used for domestic fires, but it is mostly only fit for lime-kilns and brick-kilns. The formations of the limestone group occupy nearly all the remainder of the plain, and extend S.W. to the neighbourhood of Clogher, where it rises into tolerably high mountains.

The plain of Lough Neagh is drained by the Ballinderry in the north, and the Blackwater in the south; both have the upper part of their course in the county and the lower part on the border; the length of the Ballinderry is about 25 miles; of the Blackwater, 46 miles.

The plain of Omagh is enclosed on nearly every side by mountains: it is drained by the streams which unite to constitute the Foyle. The eastern and southern part of this plain are occupied by the old red sandstone, which abuts upon, and in some places covers the granite and protruded green-stone which form the mass of the mountains that separate the two plains of Lough Neagh and of Omagh. The rest of the plain of Omagh, and the mountains which on other sides environ it, consist of mica slate, covered in extensive tracts by the old red sandstone, by the carboniferous limestone series, or by the millstone-grit.

The Camoan, or Camowen, the principal of the streams which unite to form the Foyle, rises in the mountains that separate the plains of Lough Neagh and Omagh, and flowing westward to Omagh, receives the Drumragh from the southern part of the county: it then turns northward, and flows by Newtown-Stewart to the border of the county at Strabane; and after separating for some miles Tyrone from Donegal, finally quits the county to enter that of Londonderry. Its whole length, including Lough Foyle, is about 76 miles, of which above 50 are in this county or on the border. It takes the name of Strule soon after its junction with the Drumragh; below the junction of the Derg it is called the Mourne, and finally, below the junction of the Finn, the Foyle.

The lakes are numerous; but are all small except Lough Neagh, of whose surface more than 27,355 acres, or nearly 43 square miles, are assigned in the Ordnance Survey to this county.

Soil and Agriculture.—Nearly one-fourth of the surface of Tyrone is unimproved mountain and bog. Of the remainder the plain of Omagh occupies more than one-third, and is the most fertile part. The soil is mostly of a light friable nature, and of a brown colour, upon a firm loamy subsoil, mixed with gravel, and in some places upon a

sandstone, and others upon a slaty rock. Tillage in some parts is performed on improved principles, but is generally behind that of the neighbouring counties. Peat-bogs and mosses abound in all parts of this plain, and in their vicinity the land is of a peaty nature upon a clayey subsoil.

In the mountainous districts the farms are generally large. Agriculture generally is in a backward state. Potatoes and oats are the principal crops. Cattle and sheep are of inferior breeds.

Manufactures.—The manufactures of this county are linens, coarse woollens, blankets, whiskey, beer, flour, oatmeal, and common earthenware. Coal fit for burning lime, &c., is raised at the village of Coal-Island, and carried by a canal about four miles to Lough Neagh and the Blackwater.

Divisions and Towns.—Tyrone is divided into the 4 baronies of Clogher, Dungannon, Omagh, and Strabane. About two-thirds are in the diocese of Derry and Raphoe, and one-third in that of Armagh. The assizes are held at Omagh. The county returns 2 members to parliament, and the borough of Dungannon returns 1 member.

The following are the principal towns, with the population of each in 1841 :—

Augher, a small market-town, 16 miles S.S.E. from Omagh, consists of one street and a detached group of houses. It has a market-house, and there are remains of an old castle. Population, 753.

Aughnacloy, a market-town, 20 miles S.E. from Omagh, consists of one principal street and some smaller streets. It contains some good houses, a market-house, sessions-house, church, Roman Catholic chapel, a Presbyterian chapel, and a Methodist chapel. Population, 1841.

Ballygawley, a market-town, 16 miles S.E. from Omagh, consists of one street, and contains a parish church, Presbyterian meeting-house, and a sessions-house. Population, 881.

Caledon, a market-town, 28 miles S.E. from Omagh, is an improving town, and contains many good houses, a parish church, a Roman Catholic chapel, and a Methodist chapel. Population, 1046.

Clogher, the see of a bishop, 16 miles S.S.E. from Omagh, is a small town. The cathedral is a plain modernised structure, and is the parish church. The bishop's palace adjoins the town, and is a handsome modern structure, surrounded by a fine park. Population of the town, 702.

Cookstown, a market-town, 24 miles N.E. by E. from Omagh, consists of a single street, very broad and very long. It has a good market-square, and contains a church, Presbyterian chapel, Methodist chapel, and in the vicinity a Roman Catholic chapel. Population, 3006.

Dungannon, a market-town and parliamentary borough, 24 miles S.E. by E. from Omagh, consists of four principal streets and some smaller streets. It contains a market-house, court-house, bridewell, union workhouse, parish church, Roman Catholic chapel, Presbyterian chapel, and Methodist chapel. It also contains an endowed college, the lands of which produce a yearly rent of about 1500*l.* A good deal of business is done in weaving and bleaching linen, and in agricultural produce. The borough returns 1 member. Population, 3801.

Fintona, a market-town, 8 miles S. from Omagh, consists of a single street containing some well-built houses, a parish church, Roman Catholic chapel, Presbyterian chapel, and Methodist chapel. Population, 1327.

Newtown-Stewart, a market-town, 10 miles N.N.W. from Omagh, stands on the west bank of the river Strule, and consists of several streets irregularly laid out, but well paved. It contains a church, Roman Catholic chapel, two Methodist chapels, and two Presbyterian chapels. Population, 1405.

Omagh, the assize-town, 110 miles N.W. by N. from Dublin by the road, is situated on the south bank of the Camowen, immediately below the junction of the Drumragh, and consists of one principal street and two smaller streets, and some lanes branching from it. It contains a court-house, church, Roman Catholic chapel, two Presbyterian chapels, and one Methodist chapel. Population, 2947.

Stewartstown, a market-town, 27 miles W. from Omagh, consists of three streets, which meet in a large central market-place. It is a well-built and thriving town, and contains a parish church, a Roman Catholic chapel, and a Presbyterian chapel. Population, 1082.

Strabane, 18 miles N.N.W. from Omagh, consists of a number of streets irregularly built on the north-east bank of the Mourne, a little above the junction of the Finn. A bridge over the Mourne connects the town with a small suburb of the town on the opposite bank of the river, in the county of Donegal. The houses are generally well built, and many of them handsome. There are a parish church, two Roman Catholic chapels, one of which is in the suburb beyond the river, two chapels for Presbyterians, and two for Methodists, a court-house, and bridewell. Corn (for which Strabane has the most important market in the county), salt-beef and pork, butter, eggs, and poultry, are exported; and timber, staves, iron, groceries, and general merchandise are imported. On the Foyle, below the town, is an important salmon fishery. Trade is facilitated by the Strabane Canal, the basin of which is adjacent to the town, and has good wharfs and quays. Population, 5456.

History.—This county seems to have been included in the territory of the Darnii, a nation mentioned by Ptolemæus. By the Irish it appears to have been called Tir-Oen, modernised Tyrone. It was in the northern Hy-Niellia (or country of the O'Neills), which comprehended also a large part of Donegal.

Tyrone was formed into a county in 1584, but the first sheriff was not appointed until after the close of 1603. It was comprehended in the great settlement made in Ulster in the following years, and was, in great part, parcelled out among 'undertakers' (persons who undertook to form settlements or colonies), partly Scotch and partly English.

TYRRELL, JAMES, the eldest son of Sir Timothy Tyrrell, of Shotover, near Oxford, was born May 1642, in London. He was, in 1657, admitted a gentleman commoner of Queen's Col-

lege, Oxford, where he resided three years, and then entered himself of the Inner Temple. He took his degree of M.A. in 1663, and about two years afterwards was called to the bar. He did not however follow the profession of the law, but employed a life of leisure in historical inquiries. He died in 1718.

After the Revolution Tyrrell came forth as a champion of that change in a series of 'Political Dialogues,' the first nine of which were published in quarto in 1692, the whole being afterwards collected in a folio volume in 1718, and again in 1727. Tyrrell published various treatises, controversial and otherwise, but his great work is his 'General History of England, both Ecclesistical and Civil,' in 3 vols. folio (commonly bound in five parts), London, 1700-1704.

TYRRHENI. [ETRURIA.]

TYRTÆUS, the second great elegiac poet of the Greeks. He assisted the Spartans in their second Messenian War, which is placed by Pausanias between the years B.C. 685 and 668, while others place its commencement about the year B.C. 660, and even later. His birthplace is uncertain. The story is that he was residing in Attica, when the Spartans, who were engaged in the second Messenian War, sent to Athens, pursuant to an oracle, to ask the Athenians to send them an adviser; and Tyrtæus was sent, a schoolmaster, and lame. However the schoolmaster turned out more useful than was expected, for by his elegies he inspired the Spartans with such courage that they were victorious over their enemies. He also composed an elegy on Eunómia, or Good Order, for the purpose of settling internal dissensions among the Spartans. His war songs were very popular, and were sung for many centuries after his time. Three poems of this kind are extant, but it is very improbable that they are in their genuine form. The remains of Tyrtæus are contained in Bergk's 'Greek Lyric Poets,' and in other collections. They were translated into English verse by R. Polwhele, 1786, 1792.

TYRUS, a city on the coast of Phœnicia, 200 stadia according to Strabo, 24 miles according to the Antonine Itinerary, S. of Sidon. It appears to have been of less antiquity than Sidon, but it became the chief city of Phœnicia. In the time of David and Solomon it was a great commercial emporium, and was governed by a king (Hiram), who maintained friendly relations with those princes, and assisted Solomon in building the temple and his palaces, and in his naval expeditions. About half a century later, Ahab married Jezebel, the daughter of the king of Tyre and Sidon. Tyre is repeatedly mentioned by the Hebrew prophets, who speak of its strength, wealth, beauty, and its flourishing commerce, and threaten it with destruction for its pride.

The original site of Tyre was on the mainland, but another city of the same name was built on a narrow island, about a mile in length, parallel to the shore, and nearly half a mile distant from it, and not quite four miles from the ancient city. Shalmaneser, the Assyrian conqueror, took the old city: he also blockaded the insular city for five years, but at last raised the siege (about B.C. 720-715). The insular city was again besieged by Nebuchadnezzar. It was taken, after a siege of seven months, by Alexander the Great (B.C. 332). Tyre afterwards came under the power of the Seleúcidæ, and subsequently under that of the Romans. Septimius Sevérus sent thither a Roman colony, as his medals show. It afterwards became the seat of a Christian bishopric. During the Crusades it suffered several sieges, and remained in the hands of the Christians much longer than any other city of Phœnicia. Its fortifications were almost entirely destroyed in those wars, and now it is only a small village.

The island on which it stands has been a peninsula ever since Alexander constructed the mole for the purpose of attacking it. The ruins of Tyre (now called Sur) are described by Robinson ('Biblical Researches in Palestine,' iii. 392, &c.)

TYRWHITT, THOMAS, was the eldest son of the Rev. Dr. Robert Tyrwhitt, who at the time of the birth of his son, in London, March 29, 1730, was rector of St. James's, Westminster. Thomas was educated at Eton, whence he went to Queen's College, Oxford, 1747. He resided at Oxford as a fellow of Merton till 1762, when, resigning his fellowship, he came up to London, and entered upon the duties of the office of clerk of the House of Commons. Finding the fatigue too great for his health, he relinquished this appointment in 1768, and devoted the rest of his life to literary pursuits. Mr. Tyrwhitt, who was greatly beloved for his amiable character, died Aug. 15, 1786. Tyrwhitt was a man of great learning, industry, and accuracy, and he had also good taste and critical acuteness. A list of his numerous works is given in the 'Penny Cyclopædia,' article 'Tyrwhitt.' His edition of 'The Canterbury Tales of Chaucer, with Dissertations,' &c., is valuable. His edition of Aristotle's 'Poetics' was published after his death, Oxford, 1794.

TYSON, EDWARD, was born in Somersetshire in 1649. He received the degree of B.A. at Oxford in 1670, and that of D.D. at Cambridge in 1680. He lived in London, and was physician to the Bridewell and Bethlem hospitals, reader of anatomy at Surgeons' Hall, and, for a time, Gresham professor of medicine. He was one of the chief contributors to the early volumes of the Transactions of the Royal Society, of which, as well as of the College of Physicians, he was a Fellow. He died in 1708.

Tyson was one of the first comparative anatomists of his time. His most valuable work is 'Orang-Outang, sive Homo Sylvestris; or, the Anatomy of a Pygmie, compared with that of a Monkey, an Ape, and a Man,' London, 1699, folio. Tyson contributed largely to Samuel Collins's 'System of Anatomy,' to Ray's 'Synopsis Methodica Quadrupedum,' and to Willughby's 'Historia Piscium.'

TYSSENS, PETER, was born at Antwerp, in 1625. His works, both in portrait and history, are very numerous in his own country, but there are few elsewhere. The Assumption of the Virgin, over the great altar of the church of St. James at Antwerp, is generally considered his masterpiece. His drawing was vigorous and correct, his colour-

ing good, and his composition very spirited. In 1661 Tyssens was made director of the academy of Antwerp. He died in 1692.

His two sons, Nicholas and Augustine, were also distinguished painters in their respective lines. Nicholas Tyssens was born at Antwerp in 1660; spent several years in Italy, and in 1770 was employed in the service of the elector-palatine at Düsseldorf. He visited London, where he is said to have died in 1719. He painted armour, flowers, and birds. Augustine Tyssens was born at Antwerp in 1662, and executed many pictures in the style of Berghem. He died in 1722.

TYTLER, WILLIAM, was born at Edinburgh, Oct. 24, 1711. After an education at the high school and university of Edinburgh, he was admitted a writer to the signet in 1742; and he practised that branch of the legal profession till his death, Sept. 12, 1792. Mr. Tytler, besides being an accomplished musician, and distinguished for his taste in all the fine arts, was the author of several literary works, the chief of which, his 'Inquiry, Historical and Critical, into the Evidence against Mary Queen of Scots,' first printed in an 8vo. vol., in 1759. Among his other publications are—'A Dissertation on the Marriage of Queen Mary to the Earl of Bothwell,' in the 'Transactions of the Society of Antiquaries of Scotland,' vol. i., 4to., 1791; 'The Poetical Remains of James I. of Scotland,' 8vo., Edin., 1783; 'A Dissertation on Scottish Music,' subjoined to Arnott's 'History of Edinburgh.'

TYTLER, ALEXANDER FRASER, styled Lord Woodhouselee, was born at Edinburgh, Oct. 15, 1747, and was the eldest son of the preceding. After some preparatory education in England, he entered the university of Edinburgh in 1765, with a view of studying for the bar. He was admitted an advocate in 1770. His first publication was in 1778, a supplementary (folio) volume to Lord Kames's 'Dictionary of Decisions,' bringing down the work to that date. In 1780 Tytler was joint professor (with John Pringle), and in 1786 sole professor, of universal history and Roman antiquities in the university of Edinburgh. This appointment led to the publication, in 1782, of his 'Outlines of a Course of Lectures,' afterwards expanded into 'Elements of General History,' 2 vols. 8vo., Edinburgh, 1801. In 1790 Mr. Tytler was promoted to the office of judge-admiral of Scotland; and the same year he read before the Royal Society of Edinburgh a series of papers, which he soon after published anonymously, under the title of 'An Essay on the Principles of Translation.' This was followed by various other publications. In 1802 he was raised to the bench of the Court of Session, when he took the title of Lord Woodhouselee. In 1807 he published his last work, 'Memoirs of the Life and Writings of Henry Home, Lord Kames,' 2 vols. 4to., Edinburgh. In 1811 Lord Woodhouselee was appointed a lord justiciary. He died Jan. 4, 1813.

TZETZES, JOANNES, a learned grammarian and poet of Constantinople, who lived during the latter half of the 12th century of our æra. He had a brother Isaac, with whom Joannes spent the first years of his life, in his father's house, where, as Joannes says, they were trained in all virtue and piety, and learned to despise the wealth and honours of the world. The two brothers were instructed by the ablest teachers of the time.

We possess a considerable number of works by Joannes Tzetzes, consisting of poetical compositions, or rather versified prose, commentaries on ancient Greek authors, and some minor works of a scientific character. His poetical works, most of which are written in the so-called political verse, that is, without any regard to the old prosody, are:—1. 'Iliaca,' which, properly speaking, consists of three distinct poems, which are called 'Ante-Homerica,' 'Homerica,' and 'Post-Homerica.' The first contains the whole cycle of the Trojan story, from the birth of Paris to the tenth year of the siege of Troy, where the 'Iliad' begins; the second is the mere abridgment of the 'Iliad;' and the third contains the events subsequent to the death of Hector, and an account of the return of the Greeks from Troy. The whole is, like all the versified productions of Joannes Tzetzes, exceedingly dull. The best critical edition of the text, for which a Paris MS. was collated, is that by Imm. Bekker, Berlin, 1816, 8vo. 2. 'Chiliades,' a work which, with its numerous mythical and historical tales, is a storehouse of information. The best edition is by Kiessling, Leipzig, 1826, 8vo. Besides some other poetical works, Joannes Tzetzes wrote Commentaries, of which those on the 'Iliad,' on Hesiod, and on Lycophron, have been printed.

U is at one extremity of the series of vowel sounds, lying next to the vowel *o*. In the Hebrew alphabet it does not appear, and was probably originally wanting in that of the Greek tongue.

1. The close connection between this vowel and the vowel *o* might be inferred from their relative position in the vocal gamut.

2. U long is interchangeable with the diphthongs *oe* or *oi* in Latin. Thus *cūra*, *ūtor*, *ūnus*, *mūnio*, *mūrus*, often appear in the older dialects of that language, as *coira* or *coera*, *oitor* or *oetor*, *oenus*, *moinio* or *moenio*, *moerus*. In the same way *foetus*, *foecundus*, are formed from the old verb *fuo*, by the addition of the common suffixes *tus* and *cundus*, which are so often attached to verbs. The variation in the forms of *Poeni* and *Punicus* is an example of the same principle.

3. *U* with *au*, as in the Latin forms *claudo* and *cludo*, and the Latin *mus* compared with the German *maus*, a *mouse*.

4. A short *u* with *ă*. Thus those who represent the Arabic article in English characters are divided between *al* and *ul*.

5. A short *u* with *ĕ*. Thus the Greek tongue, or rather pen, prefers the syllable *el* where the Latin writes *ul*, particularly in the penult syllable: as Σικελος, Siculus. The Germans again prefer *el*. Hence the Latin *tabula*, *fabula*, appear in German as *tafel*, *fabel*. The vowel *u* is also preferred by the Romans before *n*, if a *d* or *t* follow. Hence *rediens* has a genitive *redeuntis*, and *faciundus* is as common as *faciendus*.

6. A short *u* with *ĭ*. [See I.]

7. For the interchange of *du* with *b* and *v*, see B, D.

8. For the interchange of *l* with *u*, see L.

9. *Ou* not unfrequently results from *on*, particularly in the Greek language, as οδους for οδονς; τυπτουσι for τυπτοντι; and the accusative plural of the second declension, οικους, is a corruption of οικονς, being formed from the singular οικον by the addition of the affix for plurality.

10. For the loss of an initial *c* before *u*, see C.

11. The insertion by the English of a *y* sound before *u* is not limited to an initial *u*, as in *union*, *university*; but occurs in the middle of words. Thus, in Norfolk *true* is sometimes pronounced *tryoo*. It is probably in this way that the English have adopted the orthography *ew* in so many words, as *new*, *few*.

12. For the intimate connection of *u* with V and W, see those letters.

U'BEDA, a city in the province of Jaen, in Spain, situated at the foot of a mountain, in 37° 56′ N. lat., 3° 24′ W. long., about 25 miles N.E. from the city of Jaen, has 16,000 inhabitants, mostly employed in agricultural pursuits. The town is well built, with several wide streets, and some handsome squares. The public buildings remarkable for their architecture are—the cathedral, formerly a mosque, the church of San-Salvador, the Dominican convent in the Plaza del Llano, the hospital, the exchange, and the building called El Exido, at the commencement of the road to Baeza. Coarse woollens, blankets, and hats are the chief manufactures. The plain on which Ubeda stands is one of the most fertile parts of Andalusia, and yields abundant crops of grain and oil, which are carried into the interior. Ubeda has an annual fair on the 29th of September, in commemoration of the taking of the city from the Moors in 1239.

UBES, ST., or SETUBAL. [Estremadura, *Portuguese.*]

UCKFIELD. [Sussex.]

UDAL TENURE. The Norwegian term 'Udal,' or 'odel,' appears to be the same as the German 'adel,' or 'noble.' Tenure is an improper name as applied to Udal land, for the land so called in Norway is not held by any tenure, but is free from all services. There is neither superior nor vassal, nor any of the consequences of such feudal relation as exist in many countries in Europe. (Laing's 'Norway,' p. 205.)

UDALL, NICHOLAS, was born in Hampshire, in 1506. He became a scholar of Corpus Christi College, Oxford, in 1520, B.A. in 1524, and M.A. in 1534. He was master of Eton School and of Westminster School. In the early part of the reign of Edward VI. he was appointed to a canonry at Windsor. He died in 1564.

Udall published 'Flovres for Latyne Spekynge,' London, 1533, and some translations; but he is chiefly remarkable for his comedy of 'Ralph Royster Doyster,' which is noticed in the article Great Britain, under the head of *English Drama*.

U'DINE, a province of Austrian Italy, with an area of 2519 square miles, and a population in 1842 of 408,394, is described under Friuli, with which it is nearly coincident—the exception being that a narrow strip between the eastern boundary of Friuli and the Isonzo, which is now included in the crownland of Illyria, was formerly comprised in Udine.

Udine, the capital of the province of Udine or Friuli, situated in an elevated plain, near the foot of the Carnic Alps, about 20 miles from the Adriatic, and on the high road from Venice to Vienna, has about 20,000 inhabitants. It is a walled town, between 4 and 5 miles in circumference. Upon an eminence in the middle of the town is the old castle, once the residence of the patriarchs of Aquileia, who were for several cen-

turies lords of Friuli. Udine gives title to a bishop; it has some fine churches, especially the cathedral and the church of San-Pietro-Martire, several palaces, a handsome square lined with arcades and adorned with a fountain, several good streets, a gymnasium, a lyceum, a clerical seminary, several public libraries, two museums, an agricultural academy, a philharmonic institute, a monte-di-pietà, and a theatre. A considerable trade in silk, the produce of the country, is carried on at Udine. There are silk and leather manufactories, and a sugar-refinery.

UDINE, GIOVANNI DA. [NANNI.]

UELZEN. [LÜNEBURG.]

UFA. [ORENBURG.]

UGGI'ONE, or UGLO'NE, MARCO, called also Marco da Oggione, in the Milanese, was one of the best scholars of Lionardo da Vinci. His works in fresco, in the Place at Milan, have retained even to our time their tone and colour unimpaired. The church of St. Euphemia, at Milan, contains one of his masterpieces, representing the Virgin and Saints. He died in 1530, but his age is not known.

UGIE. [ABERDEENSHIRE.]

UGOTZ. [HUNGARY.]

UIST. [HEBRIDES.]

UKRAINE is a name formerly given to the territory which now forms the governments of Kiev, Podolia, Poltawa, and Charkow. This tract is remarkable for its rich pastures, and a fine breed of horses and horned cattle. The country is described under KIEV; PODOLIA; POLTAWA; SLOBODE UKRAINE.

ULEX, a genus of plants belonging to the section *Loteæ*, of the natural order *Leguminosæ*. The species of this genus are branched evergreen shrubs, furnished with spines, and bearing yellow flowers. *Ulex Europæus*, Common Furze, Gorse, or Whin, is an erect evergreen shrub, with yellow flowers, which appear in greatest abundance from February to May, though in mild seasons it may be seen in blossom all the year round. Furze is sometimes used for hedges, for which it is well adapted, especially where the hawthorn will not thrive. The hedges should be made wide, and regularly clipped. *U. nanus*, the Dwarf Furze, is a native of Britain, also of the west of France, in poor gravelly soils, but not common on the Continent. It is also found in Ireland. *U. strictus*, the Irish Furze, is an upright plant, seldom flowering. Its branches are soft and succulent; and in size and character it stands between the two foregoing species.

ULLESWATER. [WESTMORLAND.]

ULLOA, ANTO'NIO DE, was born at Seville, Jan. 12, 1716. He was educated for the naval service, and admitted in 1733 into the company of royal marine guards. In 1735 he was selected, along with his brother, Jorge Juan Ulloa, to accompany the French academicians to South America, to measure a degree of the meridian at the equator.

Ulloa and his companion sailed from Cadiz in May, 1735, and landed at Carthagena on July 9. They did not return to Spain till 1746. On his way home, the ship in which Ulloa sailed was captured by an English privateer, and Ulloa was conveyed to London. He was however soon set at liberty, treated with great distinction, and made a member of the Royal Society.

The task of publishing the scientific observations devolved upon Jorge Juan; to write the history of the expedition was the charge of Ulloa. The narrative appeared in 1748.

Ulloa subsequently made tours of observation, by order of the Spanish government, in several countries of Europe. After Louisiana was ceded to the crown of Spain, in consequence of the peace of 1762, he was for a short time governor of the province. After his return to Europe he published (in 1772) a volume of essays on the natural history and antiquities of America, which were followed by some other works.

In 1779, having by this time risen to the rank of lieutenant-general in the naval service, he was placed in command of a squadron fitted out on an important mission. Engrossed by his speculative inquiries, Ulloa forgot to open his sealed despatches, for which neglect he was tried by a court-martial, and though allowed to retain his rank and titles, was never again employed on active service. Ulloa died in the Isla da Leon, July 3, 1795.

ULM, the capital of the Würtemberg circle of the Danube, and a fortress of the German Confederation, is situated in 48° 24′ N. lat., 10° E. long., in a beautiful and fertile country at the south-eastern foot of the Swabian Alps, and on the left bank of the Danube, which is here joined by the Blau. The city, which is very strongly fortified, is of elliptical shape, and the ground on which it stands is tolerably level. Like most of the old German towns, it has in general irregular and crooked streets, and antique-looking wooden houses; there are however some broad handsome streets, with flag-pavement for foot-passengers. Within the city there are three stone and two wooden bridges over the Blau; and a handsome stone bridge over the Danube, which connects the town with the Bavarian village of New Ulm, on the right bank of the river. Ulm has many buildings worthy of notice. The Minster, a very fine specimen of ancient gothic architecture, and one of the largest and loftiest churches in Germany, is 485 feet long, including the choir, 200 feet broad, and the middle aisle 150 feet high. The steeple is 337 feet high. In the interior are many curious monuments and works of art; paintings by old German masters, admirable carved-work, painted-glass windows, and a remarkably fine organ. The town-house, a very ancient and spacious edifice, contains many fine paintings; in the vaults underneath are the archives, with many valuable historical documents. The Deutsche-Haus, containing the principal public offices, is considered the handsomest and most regular building in the city. The theatre is adorned externally with Corinthian columns. Besides the Minster there are two Lutheran and two Roman Catholic churches. There are in Ulm a gymnasium, a museum, a city library, a large hospital, and numerous charitable institutions. The city has now 16,000 inhabitants, who manufacture

linen, silks, snuffs, tobacco, tobacco-pipes, porcelain, &c. This city has a very considerable transit-trade. Steamers and large barges ply between Ulm and Vienna. Ulm capitulated to Napoleon Nov. 17, 1805, General Mack and the Austrian garrison of 28,000 men being made prisoners of war.

ULMA'CEÆ, a natural order of plants belonging to Lindley's rectembryose group of incomplete Exogens. The species are natives of the north of Asia, the mountains of India, of North America, China, and Europe. This order is by most botanists made a section of the natural order *Urticaceæ*. It was however separated by Mirbel, and he has been followed by Lindley. The genera are *Planera*, *Abelicea*, *Ulmus*, *Celtis*, *Sponia*, and *Mertensia*.

Most of the species of this order are trees, the timber of which is often very valuable.

The genera *Planera* and *Celtis*, like the elm, have species which are handsome ornamental trees, and yield useful timber. *Planera Richardi* is native of Siberia, and is also found between the Black and Caspian Seas, between the latitudes 35° and 47°. In its native districts it attains a height of from 50 to 80 feet. The trunk is straight and very upright, and it is often 30 or 40 feet from the ground to the point where it throws off its branches. *P. Gmelini*, Gmelin's Planera, is a native of North America, in Kentucky, Tenessee, the banks of the Mississippi, and in all the southern states. The wood is hard and strong, but it appears to be little used.

The species of the genus *Celtis* are handsome, branched, deciduous trees, varying in size and the character of their foliage, and bearing a fruit which is edible. They are natives of the temperate parts of Europe, Asia, Africa, and America. *Celtis Australis*, the European Nettle-Tree, grows to the height of 40 feet, and is indigenous to the south of Europe and the north of Africa. The fruit, when ripe, is blackish, about the size of the fruit of the bird-cherry, and is edible. The wood is highly prized. *C. occidentalis*, the North American Nettle-Tree, is found in woods and near rivers from Canada to the Carolinas. The fruit, like that of the last species, is edible, but not very grateful to the British palate. *C. crassifolia*, the Huckberry, is another North American species, and is closely allied to the last, and some botanists even think them identical. It grows very rapidly. The wood is not of much value, on account of the small size of the trunk; but in America it is used for making the bottoms of chairs, and also for baskets.

ULMIC ACID, or ULMIN. Some trees, and more especially the elm, when it is old, secrete a liquid which dries as it exudes: the residue consists principally of mucilaginous matter, with some carbonate or acetate of potash, and eventually the mucilaginous matter undergoes a change, and, combining with the potash, forms a substance which was first examined by Vauquelin and Klaproth, and Dr. Thomson gave it the name of *Ulmin*. It is of a deep brown colour, very brittle, and breaks in angular fragments, and is almost insoluble in water. It is insoluble in acidulated water or in saline solutions. It may be procured from soils, rotten leaves, bog-earth, wood-soot, or turf, by digesting them in a weak solution of potash: by this a brown-coloured solution of ulmate of potash is formed, from which acids throw down ulmic acid.

Ulmic acid (which consists of carbon, hydrogen, and oxygen) is an important element in manures and soils; and what is called *moss-water* owes its peculiar properties to its presence. It is a powerful manure, especially when combined with lime or with ammonia.

ULMUS, a genus of plants, the type of the natural order *Ulmaceæ*. All the species of the genus are trees, some of them attaining a great size and age. The flowers are small and the leaves are alternate. In most of the species the flowers appear earlier than the leaves: they are disposed in groups and seated on short peduncles. The various species of elm are wild in Europe, North America, India, and China. Nearly 20 species have been enumerated by various writers, but it is not at all certain that these are true species. The elm, whatever may be the species, has been since the time of the Romans the most commonly cultivated timber-tree of Europe. The reason of this is found in its comparatively easy cultivation, the rapidity of its growth, and the readiness with which it grows in almost any soil or situation. It also bears transplantation well, and almost at any age. It has however its disadvantages: the timber is very apt to shrink or warp, unless it be kept constantly moist, or has been cut down many years before it is used. It is also during its growth very liable to the attacks of insects, which prove destructive to its timber.

Ulmus campestris, the Common English Elm, or Small-Leaved Elm, is a native of the middle and south of Europe, the west of Asia, and Barbary. It is also found abundantly in France, Spain, and Italy. This tree grows rapidly, and often obtains a height of from 70 to 90 feet, with a trunk 4 or 5 feet in diameter, which size it frequently attains within a hundred years. The *U. campestris* is still common in Italy. On the Continent generally the elm does not appear to have been cultivated till recent times, although in England it has been so from time immemorial. In the planting and cultivation of the common elm, two objects are held in view, ornament and use. A great recommendation of the elm is its endurance of a smoky atmosphere, and it will thrive in the vicinity of large towns. The noble elms of the parks of London are a living testimony of its value in this respect. Many of the public avenues in France, Holland, and Great Britain are composed entirely of this tree; and its growing in almost every variety of soil, and requiring but little pruning, are, in addition to its ornamental qualtities, strong recommendations.

As a timber-tree the uses of the elm are very considerable. The wood loses a great deal by drying; a cubic foot weighing 70lbs. is, according to Loudon, reduced to 48½lbs. The wood is of a brownish colour, and is hard and fine-grained. It withstands well the action of water, and on this account it is used for making pumps, waterpipes,

&c. It is also used for making the keels of ships. The English elm frequently attains a great age. A tree was cut down by Sir Hans Sloane, at Chelsea, that was said to have been planted by Queen Elizabeth; it measured 13 feet in circumference, and at one time was 110 feet in height.

Cultivation of the Elm.—The English Elm (*U. campestris*) does not perfect its seeds in this country, so that it cannot be propagated by seed. In the south of England the usual way of propagating the elm is by layers, or suckers, which are thrown out in great numbers by the superficial roots. Layers are said to produce finer trees than suckers.

Medicinal Properties.—The bark of *Ulmus campestris* is officinal: it should be collected in spring from branches not too old; the outer bark is removed, and the interior, or *liber*, retained for use. It possesses demulcent, tonic, and astringent properties; and taken in full doses it accelerates the pulse, acting ultimately as a diaphoretic and diuretic.

The recorded varieties of *Ulmus campestris* are numerous. Loudon enumerates 18.

Ulmus suberosa, the Cork-Bark Elm, derives its name from the corky nature of its bark, and is supposed by Selby and others to be only a variety of *U. campestris*.

Ulmus major, the Greater or Dutch Cork-Bark Elm, is a finer and more graceful-looking tree than the last. It has larger leaves, and the bark is even more corky.

Ulmus effusa, the Spreading Elm. This is not a British species. It is a native of Russia, where it attains a great size. The wood is hard and durable, and is used where it grows for all the purposes of the common elm.

Ulmus montana, the Mountain, Scotch, or Wych Elm, is more abundant in the northern than the southern parts of England, and it becomes more abundant as it approaches Scotland. In that country this tree forms the most prominent object in its picturesque wooded scenery. It is also a native of Ireland. The leaves of the Wych-Elm are larger than those of the English Elm.

Ulmus glabra, the Smooth-Leaved Elm, is sometimes considered a variety of the last species.

ULODE'NDRON, one generic division of the great group of Lepidodendroid families of plants which occur in the coal formations.

ULPIA'NUS, DOMI'TIUS, a distinguished Roman jurist. The year of his birth is not known. His family is said to have been originally from Tyre. In the reign of Septimius Sevérus and of his son Antoninus Caracalla (A.D. 198–211), Ulpian was a writer on law, but more particularly under the sole reign of Caracalla, as appears from various passages in his writings. He was banished by Elagabálus, but the elevation of Alexander Severus to the imperial power (A.D. 222) opened to him the road to new honours. He became scriniorum magister and præfectus annónæ, and was a particular favourite of the Emperor. He also held the office of præfectus prætorio under Alexander Severus. Ulpian was a confidential adviser of Alexander, and exercised great influence over him. Xiphilinus, the epitomator of Dion, fixes on Ulpian the imputation of clearing the way for his promotion to the dignity of prætorius præfecto by causing the execution of his predecessors. This fact is not mentioned by any other ancient authority, and it is inconsistent with the character which Lampridius gives Ulpian, whom he calls a good man. Ulpian was murdered shortly after (A.D. 228), in the night-time, by the prætorian soldiers, in the palace of Alexander, and in the presence of the Emperor and the Emperor's mother. (Dion, lib. 80.)

Ulpian was one of the most fertile of the Roman writers on law. His works are only known to us from the 'Florentine Index' and the excerpts in the 'Digest.' His great work 'Ad Edictum' was in eighty-three books. From this and twenty-two other works there are numerous excerpts in the 'Digest,' which amount in the whole to about one-third of that compilation. The style of Ulpian is clear, and more diffuse than that of his great contemporary Paulus.

The fragment entitled 'Domitii Ulpiani Fragmenta' consists of twenty-nine titles, and is a valuable source for our knowledge of Roman law. There is an edition of these Fragments by Böcking, Bonn, 1836.

ULPIANUS OF ANTIOCH, a rhetorician, the contemporary of Constantine the Great, is the reputed author of Prolegómena, and a Commentary (Ἐξήγησις) on the Olynthiac and two of the Philippic orations of Demosthenes. There are also attributed to him Commentaries on the Orations of Demosthenes, commonly called 'Symbuleutici,' and on the 'Oration of the Crown,' the 'Oration against Leptines,' and others. These Commentaries are printed in Dobson's 'Collection of the Attic Orators,' and in other editions.

ULSTER, the northernmost of the four provinces into which Ireland is divided. It is bounded on the N. and W. by the Atlantic Ocean, E. by the Irish Sea, S.E. by the province of Leinster, and S.W. by that of Connaught. It is comprehended between 53° 45′ and 55° 25′ N. lat., and between 5° 25′ and 8° 50′ W. long.

It comprehends nine counties, the areas and population of which are stated in the article IRELAND.

Ulster is mountainous. Two mountain groups cross the province from east to west. The northernmost, which passes through the counties of Antrim, Londonderry, and Donegal, is divided into three parts by the valleys or depressions through which the Bann and the Foyle reach the sea. The mountains of Donegal are the loftiest: several of the peaks rise to the height of more than 2000 feet; and one (Erigal) is 2460 feet above the level of the sea. The coast of Donegal is very rugged, marked by deep inlets, as Lough Swilly and Lough Foyle (between Donegal and Londonderry), stupendous cliffs, bluff headlands, and numerous islands. The southern mountains commence on the east coast, in the county of Down, where Slievh Donard, one of the Mourne Mountains, rises to the height of 2796 feet above the level of the sea. The other mountains in the southern part of the province are lower, and

extend through the counties of Monaghan, Cavan, and Fermanagh. A lower and comparatively level district intervenes between the northern and southern mountains, and occupies a considerable part of the counties of Down, Armagh, and Tyrone, extending from Belfast Lough and Strangford Lough on the east, to Lough Erne and Lough Derg on the west. Lough Neagh is in this central low country. [NEAGH, LOUGH.]

The mountains of Donegal and Londonderry are chiefly of mica-slate, except in the north-west of Donegal, where they consist of granite and quartz rock. The mountains of Antrim are of tabular trap. The basaltic rocks known as the Giant's Causeway are on the north coast of Antrim.

The Mourne Mountains are granitic: the other southern mountains consist of grauwacke, grauwacke-slate, clay-slate, old red sandstone, yellow conglomerate (the lowest member of the carboniferous limestone series), and millstone-grit.

The principal rivers flow from south to north, rising in the southern mountains, crossing the intermediate low country, and passing through openings in the northern mountains into the Atlantic. Several flow in different directions into Lough Neagh, of which the Bann is the outlet. Others unite in the Foyle. The principal lakes are Lough Neagh, in the centre of the province; and Lough Erne, Lough Derg, Lough Macnean, and Lough Nilly, in the south-west. Belfast Lough, Strangford Lough, and Loughs Larne, Foyle, and Swilly, are land-locked inlets of the sea.

Ulster was one of the five provinces into which, at an early period, Ireland was divided. In this province the northern Hy Nialls, or O'Neills, had their seat. In the Anglo-Norman invasion, the earliest attack upon Ulster was made, in 1177, by John de Courcy, who conquered part or the whole of Ulidia (now the county of Down and part of Antrim), and extended his incursions with various success into other parts of the province. He assumed or received the title of Earl of Ulster; but on his decease his lands and title were transferred to Hugh de Lacy, and the title was inherited by the De Burgh and Mortimer family. The greater part of the province remained however in the hands of the native chieftains until a comparatively late period. Insurrections having led to extensive forfeitures in the six counties of Donegal, Tyrone, Coleraine (now Londonderry), Fermanagh, Cavan, and Armagh, it was determined to bestow them on Englishmen or Scotchmen, on 'Servitors in Ireland,' or on natives of Ireland who were to be made freeholders, all termed 'Undertakers,' to whom were severally assigned lots of 1000, 1500, and 2000 English acres, upon different tenures, on condition that they should build on each of the largest (or 2000 acre) grants a castle, and on each of the other grants a brick or stone house, each castle or house surrounded by a strong court-yard or 'bawn;' and should settle or 'plant' a certain number of tenants, who were to be Scotch or English, except on the lands of the 'Irish servitors,' who might take English or Irish tenants at their choice. Large grants were assigned to the corporation and some of the trading companies of the city of London, from which the town and the county of Derry received the distinctive prefix of their name, London-derry.

ULTRAMARINE, a well-known blue pigment of extraordinary beauty and great permanence. It was originally, and indeed until within a few years, entirely prepared from the lapis lazuli, or lazulite. [LAZULITE.]

This colour is now prepared at a very moderate price, and equal in beauty to that obtained from the lazulite. M. Gmelin of Tübingen considers that sulphuret of sodium is the colouring principle both of the natural mineral and the artificial products. The artificial ultramarine is stated to be prepared by adding freshly-precipitated silica and alumina, mixed with sulphur, to a solution of caustic soda, and the mixture is to be evaporated to dryness: the residue is put into a covered crucible and exposed to a white heat, by which, when the air has partial access to it, a dark pure blue mass is obtained. The product is then reduced to impalpable powder. The proportions of materials to be used are, about 36 silica, 36 alumina, 24 soda, and 3 sulphur.

ULUG BEG. The real name of this prince was Mirza Mohammed Targai, but he is better known by the surname of Ulug (or Ulugh) Beg. He was the grandson of Timur, being the son of Shah Rokh, the son of Timur, and was born A.D. 1394. He governed his father's territories as regent, his capital being Samarcand, from an early age until A.D. 1447, when he succeeded to the throne by his father's death. Ulug Beg reigned in his own name only two years, and was put to death by his own son.

The astronomical labours of this prince have handed down his name. He was the founder of an observatory, and the patron of some of the best astronomical tables among those which preceded the invention of the telescope. It even appears that he was himself a diligent observer, and in some, perhaps a great degree, the author of the tables which bear his name.

The astronomical works of Ulug Beg were written in Arabic, but were afterwards translated into Persian, from which language the principal of them were translated into Latin by Greaves and Hyde.

ULVA'CEÆ, a tribe of Cryptogamic plants belonging to the natural order of *Algæ*, and to the inarticulate division of that order. Under the article SEA-WEEDS, the most important tribes of the division *Inarticulatæ* of the order *Algæ* are described, with the exception of *Ulvaceæ*, *Siphoneæ*, and *Lemanieæ*.

The *Ulvaceæ* include plants which are found in the sea, in fresh water, or on the damp ground. They are generally of an herbaceous green or fine purple colour, and have a thin, tender, membranaceous, reticulated structure, rarely gelatinous. This tribe contains about ten genera, of which the following are British. *Porphyra*, the Purple Laver, has a plain frond, exceedingly thin, and of a purple colour. Four species of the Purple Laver are enumerated. The most common is the

Porphyra laciniata, common in the sea from spring to autumn, and growing on rocks and stones. It is gelatinous, and is sometimes eaten. *Ulva*, Green Laver, has several British species, three growing in the sea, one in fresh water, and three in damp places on the land. *U. latissima*, the Broad Green Laver, is an abundant plant on the rocks and stones of the sea in summer and autumn. In common with *U. lactuca*, the Lettuce Green Laver, it is gathered and eaten. *U. bullosa*, the Blistered Green Laver, is the fresh-water species. The terrestrial species of *Ulva* are found growing on walls, rocks, the roofs of thatched houses, and especially in places exposed to much moisture. *U. thermalis* grows in hot-springs at a temperature of 117° Fahrenheit. The genus *Tetraspora* inhabits fresh water, and includes two British species. *Enteromorpha*, the Water-Gut, has seven or eight species described as British. They are all inhabitants of the sea, or of pools and ditches of salt water, with the exception of *E. intestinalis*, which is also found in fresh-water pools. *Bangia* was named after Hoffman Bang, a Danish naturalist, who wrote a work on the *Confervæ*.

ULVERSTONE. [Lancashire.]

ULYSSES, ULYXES, or ULIXES, is the name under which the Greek hero Odysseus (Ὀδυσσεύς) was popularly known among the Romans. Ulysses, who is the hero of Homer's 'Odyssey,' was a son of Laertes and Anticleia, king of Ithaca, husband of Penélope, and father of Telémachus. The story of Ulysses, as related by Homer, has been much extended and modified by later poets and mythographers. In Homer he is represented as the model of a prudent warrior, as a man of great experience and acuteness, always ready to devise means of avoiding or escaping from difficulties, as superior to all men in eloquence and intelligence, in wisdom equal to the gods themselves, and in adversity courageous and undaunted. Later poets, and the Greek tragedians sometimes, represent him in a different light, as cunning, false, and mean. When the Greek chiefs had resolved upon their expedition against Troy, Agamemnon went to Ithaca to invite Ulysses to join them, but it was not without difficulty that he was induced to assist in the enterprise. He joined the other Greek chiefs in the port of Aulis, with twelve ships. During the war against Troy he acted a prominent part, sometimes as a gallant warrior, and sometimes as a bold and cunning spy or emissary. After the destruction of the city his wanderings and sufferings began, which form the interesting story of the 'Odyssey,' from the fifth book included. The story terminates with his return to Ithaca, the destruction of the suitors who had been eating up his substance, and the acknowledgment of their true king by the people of Ithaca.

UMBEL, in Botany, a form of inflorescence in which there are several flower-stalks all radiating from a common point, and having an equal length.

UMBELLI'FERÆ, a natural order of plants. Most of the species are herbs, seldom shrubs.

The arrangement of this order has always been a matter of difficulty, arising from the circumstance of the whole family being connected together by so many peculiar characters. The same difficulty arises in the subdivision of other orders, in which the primary characters are well marked, as *Compositæ* and *Gramineæ*.

The genera include above 1000 species. These are principally inhabitants of the northern temperate zone, and the greater number of them are found in the old world.

The properties of this order are variable, and very important. One of the distinguishing characters of the order is the possession of an acrid principle which finds its full development in such plants as the Hemlock (*Conium*), the Cowbane (*Cicuta*), *Œnanthe*, *Helosciadium*, *Æthusa*, &c. This renders the whole order suspicious.

Another important secretion of the *Umbelliferæ* is a volatile oil. This secretion is found in all the species, with the exception of *Conium*, deposited in the canals of the pericarp, which are called vittæ. In some of the species it is more abundant than in others; and on this account the fruit, which is commonly called the seeds, is used frequently in diet as a condiment, and in medicine as an aromatic and carminative. Of these the carraway, the anise, the dill, the cumin, and coriander are best known.

A third secretion of these plants is a gum-resin. This probably, like the two last secretions, is common to the whole order, but is fully developed in only a few species. The gum-resins produced by this order have had a great reputation in medicine, and many of them are still looked on as valuable remedies. The Laser, or Silphion, of the ancients, is secreted by plants belonging to this order, and Assafœtida, Galbanum, Gum-Ammoniacum, Opoponax, and Sagapenum are much used as stimulant medicines in nervous diseases at the present day.

A fourth secretion, which also on account of its occasional excess renders this order important to man, is starch. This secretion, which forms so large a portion of the food of animals, is deposited in largest quantities in the roots of the carrot, the parsnip, and the skirret, and on this account these plants are extensively cultivated. Most of the roots however contain this principle, and might be used as articles of diet, but that they also contain the poisonous principle of which we have before spoken. Many of the *Umbelliferæ* are much affected in their secretions by climate and cultivation. Thus the deadly hemlock in Russia is an eatable plant, whilst the celery of our gardens, if grown on the roadside, becomes an active poison.

UMBER, an ore of iron and manganese, employed as a brown pigment. Occurs massive, amorphous. Structure earthy. Soft. Falls to pieces in water. Colour blackish, reddish, of yellowish brown. Specific gravity, 2.206.

It occurs in beds with brown jasper in the Isle of Cyprus. It is stated to consist of—oxide of iron, 48; oxide of manganese, 20; silica, 13; alumina, 5; water, 14.

UMBILI'CUS (Conchology). When the inner sides of the whorls or volutions of a spiral shell do not touch each other, so that its axis is hollow, that hollow is termed the *Umbilicus*.

UMBO (Conchology), the name for that point in a conchifer or bivalve shell which constitutes the nucleus or apex of each valve, and which is generally situated above the hinge, and always near it. From this nucleus or umbo the longitudinal rays of the shell diverge, and the lines of growth, commencing immediately around the nucleus or umbo, increase in gradually enlarging concentric layers to the outer margin of the valve.

UMBRA. The Latin word has been used to signify the shadow of the earth or moon in an eclipse: the word *Penumbra* is still retained to signify that portion of the heavens which is partially shaded.

UMBRELLA-BIRD. [Coracina.]

UMBRI, OMBRI, or O'MBRICI, were one of the oldest peoples of Italy. They appear to have been living at a very remote period in the highlands of the central Apennines, whence they descended into the valleys of the Tiber and the Nar. They spread also beyond the Apennines, to the coast of the Adriatic. Sarsina, on the river Sapis, and Sentinum, were towns of the Umbri north of the Apennines. The Umbri came into collision with the Etruscans, who took many towns from them. They afterwards joined the Etruscans against Rome, and about B.C. 307 they acknowledged Rome's supremacy.

Umbria, under the Roman republic, was one of the divisions of Italy proper, extending from Ocriculum on the south to Ariminum and Pisaurum on the Adriatic coast. On the east the river Æsis separated Umbria from the Picenum, and the Nar from the Sabinum. On the south Umbria bordered upon Latium, and on the west upon Etruria. The Rubicon formed its boundary towards Cisalpine Gaul.

UMBRIA. [Umbri.]

UMEER. [Ambeer.]

UMPIRE. AWARD. The word umpire is sometimes used to denote the person who in the first instance decides a controversy; but in its legal sense it means a person named in the Submission, or under its authority, by the arbitrators [Arbitration] to decide the matters referred, which the arbitrators either cannot or will not decide.

The rules which govern an arbitrator regulate the conduct of the umpire also.

UNAU, Two-Toed Sloth (*Brádypus didáctylus* of Linn.). There are several fossil forms of great interest, closely related to the sloths, particularly to the genera *Megatherium* and *Mylodon*. The Megatherioid Sloths, although as herbivorous as their puny representatives, were, from their vast bulk and weight incapable of climbing trees; but they made the tree fall before them. With their powerful claws they laid bare the roots, and then, fixed firmly upon a tripod formed by the hinder limbs and a massive muscular tail, they wrenched the tree to and fro till it bowed its head to the ground; nor is this wonderful, when we reflect upon the extraordinary power of the muscles of these singular animals. We allude, of course, to the living relics of a once numerous group of leaf-eating *Edentata*, which were far more massive than the elephant, and at some remote epoch trod the vast forests of the New World.

Of the Phyllophagous Edentata we may enumerate the following genera. 1, *Bradypus*; 2, *Cholœpus* (extant); 3, *Megalonyx*, or *Megatherium*; 4, *Mylodon*; 5, *Scelidotherium*; 6, *Cœlodon* (Lund.); 7, *Sphœnodon* (Lund.), all fossil.

In the 'Proceedings of the Zool. Soc.,' 1849, Mr. J. E. Gray divides the Sloths into three distinct genera, viz., *Cholœpus*, *Bradypus*, and *Artopithecus*, and to this work we refer for particulars.

UNCA'RIA, a genus of plants of the natural family of *Rubiaceæ*. The species are chiefly natives of India, but a few are found in America. The Gambier Plant, *Uncaria Gambier* of Roxburgh, is a native of Penang, Sumatra, Malacca, &c. The substance called Gambier by the Malays is prepared from this plant, and is known in commerce by the names of Terra Japonica and Catechu.

UNDERWRITERS. [Ships, x., 970.]

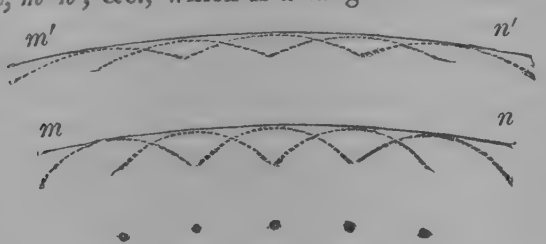
UNDULATORY THEORY OF LIGHT, a theory in which it is attempted to explain the phenomena of light by the supposed vibrations of an ethereal medium. Descartes is considered as the first who entertained the opinion that vision might be so explained; but Huyghens ('Tractatus de Lumine') both advanced the undulatory hypothesis and explained by it the principal circumstances relating to the reflection and refraction of light. The hypothesis has since been adopted by many distinguished mathematicians, both in this country and on the Continent.

A straight line, which, proceeding from a radiant point, would in the theory of emission be called the direction of a ray of light, is, in the undulatory theory, considered as the direction of a wave's motion; and vibrations, very short in extent, of the ethereal particles in any direction about their mean places in such line, but always in planes perpendicular to the direction of the wave's motion, constitute common light. The interval, in that direction, between two nearest points at which particles, setting out at the same instant from those points, return to the same points after having performed an entire vibration, is called the length (l) of a wave: and if t represent the time in which a particle makes a complete vibration, $\frac{l}{t}$ will denote the velocity of a wave of light, or the velocity of light. No perception of light is supposed to be produced by any vibrations which the particles of ether may make in the direction of the wave's motion. The intensity of light on a screen, or in the eye, is supposed to depend on the greatest extent of the transverse vibrations of the particles when they touch the screen or the retina of the eye; and is represented by the square of that greatest extent of vibration. Plane Polarised Light is that in which the vibrations of the ethereal particles (still taking place in planes perpendicular to the direction of the wave's motion) are performed, some in lines parallel to one another and to one plane passing through the direction of the wave's motion, and others in lines parallel to one another and to

a plane passing through that direction, but perpendicular to the former plane. Thus, if the direction of the wave's motion be perpendicular to this paper, the vibrations both of common and polarised light are performed in planes parallel to the paper; and, if the particles vibrate in directions parallel to any line in the paper, the light is said to be polarised in a plane passing through a line in the paper at right angles to that line.

The motions of the ethereal waves in lines radiating from a luminous point being supposed equal, the particles which are in the surface of an imaginary sphere having the luminous point for its centre will be in like positions, or like states of condensation, with respect to those which are within and beyond that surface. As the impulse communicated to the luminous particles continues, the radii of the spherical surfaces (the surfaces of the waves) increase in length, so that if the origin of the light is at a celestial body the surface of the wave at the earth may be considered as a plane.

When the waves from a luminous point arrive at or near any surface which may arrest or change the rate of their progress, every point in such surface is conceived to become the centre from whence, as if it were a new luminous point, proceeds another series of concentric spherical waves, the length l remaining the same as before if the ethereal medium is the same. The waves thus proceeding from the different points of an object by which the original wave was arrested interfere with one another, but a plane or curved surface, as $m\ n$, $m'\ n'$, &c., which is a tangent to the surfaces



of the secondary waves at points where the particles are in like states, or phases, is to be considered as the front of a wave.

The secondary waves thus arising may be either reflected back from the surface of the medium on which the original wave is incident, or they may be transmitted through that medium. In the latter case they are supposed to be produced either by vibrations immediately communicated to the ethereal matter within the medium, or to this matter through vibrations excited in the particles of the medium itself; but the velocity of the transmitted waves is supposed to be different from that of the incident waves when the density or elasticity of the refracting medium differs from that in which the rays moved previously to their incidence.

The number of vibrations to or fro which an ethereal particle makes in a given time is supposed to determine the colours of natural bodies; but the velocity is constant, since it depends on the homogeneity and uniform elasticity of the ethereal medium: therefore the values of l and t differ for different colours. The values which cause the perception of redness are the greatest, and those which produce the violet colour are the least.

In order to explain the manner in which reflection takes place at a plane surface, on the undulatory hypothesis, let the direction of a wave's motion be oblique to the reflecting surface, so that the plane forming the front of the incident wave may meet that surface obliquely. Then the points at which the particles are successively arrested become the centres of spherical waves diverging thence; and these waves moving with the original velocity, form a plane touching all their spherical surfaces, which becomes the front of the reflected wave, and makes an angle with the reflecting surface equal to that which is made by the incident wave, but in an opposite direction with respect to a perpendicular drawn from that surface. Consequently the directions of the motions of the incident and reflected waves, which are lines perpendicular to their fronts, make equal angles with the reflecting surface.

The manner in which ordinary refraction at a plane surface takes place on the undulatory hypothesis may be thus explained. Let the plane front of a wave meet the refracting surface obliquely; then the points in which the particles successively arrive there become by the interruption the centres of spherical waves whose particular fronts advance in the refracting medium with velocities equal to one another, but different from that of the incident waves: consequently, a plane touching the fronts of all the refracted waves will make, with the refracting surface, an angle whose sine is, to that of the angle made by the front of the incident wave with the same surface, in a constant ratio, which is that of the velocities of the waves after and before refraction. Thus, in the same medium, the sine of the angle of incidence is, to that of the angle of refraction, in a constant ratio.

In order that the relation between the sines of incidence and refraction may be conformable to the results of experiment, it is necessary to assume that the velocity of the waves is diminished when they enter a medium more dense than that in which they previously moved; and in this circumstance the undulatory theory is opposed to the theory of emission: for in the latter the velocity of light is supposed to be increased when it passes from any medium into one more dense.

When several undulations coexist, they are said to interfere with one another; and assuming that the displacement of a particle produced by any number of coexisting undulations may be expressed by the sum of the displacements which the undulations would separately produce, the rules of integration will give the whole amount of the disturbance produced by the interference of any number of waves. When, for example, two waves are equal in length, the greatest amplitudes of vibration may occur at places which are at intervals from one another equal to l, $2l$, $3l$, &c.; and if the amplitudes are equal, the whole amplitude of vibration will be double that of one particle alone: thus on a screen the light produced by the two undulations will be twice as great as that which would be produced by one. On the other hand, if two equal undulations are transmitted in the same direction, and the one follows

the other at an interval equal to $\frac{1}{2}l$, $\frac{3}{2}l$, $\frac{5}{2}l$, the maximum of amplitude in one will coincide with the minimum in the other, and the effects will be destroyed, or the particles will be at rest, and on a screen darkness will be the result. If the undulations follow at other distances, the destruction of the vibrations will be incomplete, and on the screen the brightness will have some intermediate degree of intensity.

When Newton had succeeded in explaining the phenomena of the concentric coloured rings which are formed between the surfaces of two prisms or convex lenses of glass, by assuming that the particles of light in a refracting medium experience alternately, at the end of very small and equal intervals, fits of easy reflection and of easy transmission, he applied the principle to the passage of rays near the edge of an opaque body. He conceived that by alternate fits of easy attraction and repulsion in the particles of light the rays might assume a serpentine form; and that from corresponding points in the flexures they might send off particles in lines which, crossing one another, would form series of points where the light would be more condensed than in the intermediate spaces. The order and magnitudes of the bands or fringes thus produced on a screen have to a certain extent been explained by Newton's hypothesis, but the theory of the interference of waves will account completely for the phenomena.

It was objected by Newton to the undulatory theory, that, if just, light passing by the edges of an opaque body ought to be inflected into the shadow cast by the body, as waves of air and water flow round any obstacle which may be in the direction of their motion. This difficulty has not wholly been removed; but it is well known that such inflexions do really take place to a certain extent, and the circumstances attending them have been fully explained by the theory. Dr. Young allowed a diverging pencil of light to pass into a dark room through a very small orifice, and, having placed in the pencil a narrow and opaque body with parallel sides, he observed that the shadow which the body cast on a screen was divided by parallel coloured bands alternately dark and bright, the band in the middle being always bright. In order to account for this appearance on the undulatory hypothesis, it is only necessary to observe, that, the paths of the waves of light from the edges of the body to a point on the screen opposite its centre being equal to one another, the fronts of the interfering waves must arrive at that centre in the same state; and their effects being added together, there must result a maximum of brightness; but the paths of the waves from the edges of the body to any other part of the shadow on the screen will be unequal; and at every place where the difference is exactly an uneven multiple of $\frac{1}{2}l$, the waves must arrive in opposite phases, and thus destroy each other's effects, or produce darkness. Between these dark bands the degrees of brightness will depend upon the states of the interfering waves at those places. If the incident light is homogeneous, or of one colour, all the bright bands are of that colour, and the intervals between them are black.

If the orifice is a narrow slit with parallel sides, the image on the screen will be a series of parallel bands alternately dark and bright, and symmetrically disposed on each side of a bright band in the centre. If the orifice is circular, the central image is either a bright or a dark spot, according to the distance of the screen; and about it are concentric coloured rings.

The breadths of the bands, and the diameters of the concentric circles of light and darkness, are found to depend on the breadth or diameter of the aperture, and not on the nature of the material by which the diffraction is produced; and Dr. Young considers this circumstance as a strong argument against the opinion that the phenomena are the results of attractive and repulsive forces exercised by the edges of the material on the particles of light. But, at the same time, it may be observed that some discrepancies between the results of the undulatory theory and the phenomena of diffraction within the shadows of small circular discs have been pointed out by Professor Potter of University College, London.

From the breadths of the bands produced by the diffraction of light are obtained the lengths of the waves of different colours. This length, for the extreme red colour, has been found to be 0.0000266 inch, and for the extreme violet colour 0.0000167 inch. The length of a wave for each colour is very nearly four times the length of a fit of easy reflection or easy refraction in the corpuscular hypothesis.

In the wave theory it is assumed that common white light is caused by the combined undulations of the ethereal medium, when waves of different lengths are mixed together; and the most serious difficulty to which that theory is subject lies in the imperfect explanation which it affords of the unequal refrangibilities of different colours. Mr. Airy suggests that the development of the action caused by the particles of a refracting medium may depend on time, and on that account it may give rise to unequal refrangibilities by producing differences in the velocities with which waves are transmitted through the medium. ('Mathematical Tracts,' pp. 285–6, note.) [DIFFRACTION; POLARISATION OF LIGHT; CIRCULAR POLARISATION; ELLIPTICAL POLARISATION.]

UNFUNDED DEBT. Exchequer bills form the principal part of the unfunded public debt of Great Britain. These bills are issued under the authority of parliament for sums varying from 100*l.* to 1000*l.* and bear interest. They were first issued in the reign of William III.; and although their amount has since varied greatly at different times, the convenience which they afford to individuals and their advantage to the public have been such as to cause their constant issue. The exchequer bills which were issued in Nov., 1849, bore interest at 2*d.* per 100*l.* per day; but in May, 1850, the interest was reduced to $1\frac{1}{2}d.$

UNGHVAR. [HUNGARY.]

UNGUENTS, or ointments, are unctuous substances, for external application, and intended to answer a variety of purposes, according to their composition. The chief use of ointments is either

by their emollient qualities to soften tense or hardened parts, or to sheath excoriated parts from acrid secretions or the irritation of the air.

UNGULA'TA, *Hoofed Mammalia*. Under this section Linnæus included the orders *Belluæ* and *Pecora*. The *Belluæ* comprised the genera *Equus*, *Hippopotamus*, *Sus*, and *Rhinoceros*. The *Pecora* consisted of the genera *Camelus*, *Moschus*, *Cervus*, *Capra*, *Ovis*, and *Bos*.

UNION, IRISH, SCOTCH. [IRELAND; SCOTLAND.]

UNION-FLAG. [BANNER.]

UNIO'NIDÆ, a group of fresh-water shells or River Mussels, divided into several subfamilies and genera by Mr. Swainson. These are the *Naiades* of Lamarck. [NAIADES.]

U'NISON, in Music, is a sound which is exactly the same as another, in regard to pitch.

UNIT or UNITY, the name given to that magnitude which is to be considered or reckoned as one, when other magnitudes of the same kind are to be measured. It is not itself *one*, but is the magnitude which *one* or 1 shall stand for in calculation: it is a length, or a weight, or a time, as the case may be, while 1 is only a numerical symbol. This symbol 1 represents the abstract conception of singleness, as distinguished from multitude, and is the unit of abstract arithmetic: but all concrete quantities must have units of their own kind.

UNITARIAN. This term, in its strict and literal interpretation, denotes simply a believer in one God; and, when thus understood, is a generic term, applicable to all Christians, for they all profess to receive the unity of the divine nature; and not only so, but to Jews and Mohammedans also, and even to those unbelievers commonly called Deists, who, on the grounds supplied by natural reason alone, admit the existence, providence, and moral government of one Supreme Being. But it is more commonly understood as opposed to Trinitarian, and is accordingly the received denomination of those Christians who acknowledge one God in one person, as distinguished from those who conceive of him in three persons, characters, or relations, each of which they regard as the proper object of a distinct and separate religious worship. The Unitarian Christian believes the Father to be the only true God, and Jesus his messenger to be the Christ. (John, xvii. 3.) This is the leading fundamental principle, which constitutes the true and complete definition of the term; under which are consequently included all those who, receiving the divine authority or commission of Jesus Christ, believe him to be a dependent creature, deriving his existence from the Father, and therefore as the fit object of all the veneration, submission, and obedience which can be offered to a creature, but not of religious worship properly so called. Agreeing in this great and leading principle, Unitarians differ in their opinions as to the origin, nature, and dignity of the author of their religion. Some believe him to have been a celestial spirit of great power and dignity, existing before all worlds, and employed by the Father as his instrument or agent in the creation of the universe, or at least of this portion of it in which we dwell. These are usually called, and call themselves, Arians; though differing in various particulars from the distinguishing tenets of that celebrated heresiarch. Of this class was the late Dr. Price, and many of the principal English Unitarians in the earlier part of the last century. Others believe Jesus to have had no existence previous to his birth, and to have been simply 'a man approved of God by miracles and wonders and signs, which God did by him.' (Acts, ii. 22.) These are not unfrequently styled Socinians: but they themselves, almost universally, reject this appellation; both because it is usually given as a term of reproach, and also because Socinus held certain opinions which they disapprove, particularly the duty of praying to Christ. Unitarians believe that in Christ dwelt all the fulness of the Godhead, inasmuch as the Spirit was not given by measure unto him, and as he was invested with full power to make known to the children of men the will and intentions of God concerning them; and they require no other evidence than his authority for receiving all which he delivered as coming from God. On this authority they believe that there will be a resurrection from the dead, both of the just and of the unjust, when all shall be rewarded according to their works, and when Christ himself shall come in the glory of his Father to judge the living and the dead. They believe that the truth of this declaration was ascertained and exemplified by his own resurrection from the grave. They believe that he was sent to include both Jew and Gentile in the terms of a new and better covenant; and to admit the whole race of mankind to a participation in the privileges of the family of God. For this reason it is that the death of Christ is described by himself as the blood of the new covenant, shed for many for the remission of sins; and hence Unitarians receive him not as God himself, but as the *image* of God (2 Cor., iv. 4), and a ray of his Father's glory—as the one Mediator between God and man.

Unitarians believe in the Atonement; understanding that term in the sense in which it is used in the only place where it occurs in the New Testament, namely, reconciliation. Men were enemies to God by wicked works; they were reconciled by the death of Christ, that is, by the new covenant of grace and mercy ratified by his death, in as far as they have been reclaimed from sin to a life of righteousness. In this sense they think that Christ died *for* us; not in our stead, but on our behalf; to procure for us the benefit of a new and better dispensation. Thus the terms or conditions of salvation are 'repentance towards God, and faith in the Lord Jesus Christ.'

Unitarians profess to look for everything they have or can expect solely to the free grace and mercy of God, manifested in the gospel of Jesus Christ. This alone is the *procuring* cause of salvation, of which conversion, where necessary, and repentance and better obedience, in all cases, are the prescribed and indispensable condition; a condition which they believe that all men are competent to fulfil, by a diligent and conscientious exercise of their natural powers.

Unitarians for the most part believe in the doctrine of Universal Restitution; considering punishment, both here and hereafter, not as the expression of what is called *vindictive* justice, but as the instrument of a remedial discipline, destined ultimately to bring back the sinner from the error of his ways. Others however are understood to believe in the final destruction of sinners. But it should be observed that on this, as on all other points, it is difficult to give any precise statement; because in fact there does not exist any Unitarian *Creed*, or standard, which the general body have ever formally recognised as of authority.

Without touching on the controversies which have arisen respecting the history of Unitarianism in the primitive church, it may be sufficient to observe that it quickly made its appearance among the leading reformers of the 16th century. The fate of Servetus, who was burnt at Geneva for the profession of this obnoxious sentiment, is the foulest blot on the character of Calvin. Several of the most eminent of the Italian reformers of that period were anti-Trinitarians of different degrees, some of whom became distinguished lights and founders of Unitarian churches in distant lands. In this country, during the reigns of Edward VI., Elizabeth, and James I., several persons expiated the offence of this form of heresy at the stake; but the first religious society established in England avowedly on this principle was gathered in the time of the Commonwealth by Biddle, who may therefore be styled the father of English Unitarianism. The Unitarians of the present day in this country are chiefly the descendants and representatives of that branch of the early Nonconformists who received the denomination of Presbyterians; and they are still known by that name, though no Presbyterian form of church-government, properly so called, has ever existed either among them or their predecessors. A smaller body are Baptists; and a few societies now Unitarian originally belonged wholly or partially to the Independent denomination. In the proper sense of the word they are all Congregationalists; inasmuch as every society is a distinct religious community, acknowledging no external control upon earth in spiritual concerns.

In this article no attempt has been made to exhibit the scriptural proofs on which Unitarians are accustomed to rely; still less to give any minute critical examination of the texts usually cited in opposition to their doctrines; but merely to state as concisely and distinctly as possible what those doctrines are. Those who wish to obtain further information on this subject are referred (among other sources) to Lindsey's 'Apology and Sequel;' Lardner's 'Letter on the Logos;' Belsham's 'Calm Inquiry;' Carpenter's 'Unitarianism the Doctrine of the Gospel;' 'Yates's 'Replies to Wardlaw;' and the Doctrinal Discourses of the late Dr. Channing.

UNITED STATES OF NORTH AMERICA. The geography, topography, statistics, and a sketch of the history of each state have been given under the names of the respective states.

History.—The first colonisation of North America is noticed under AMERICA, i., 601. The hostilities between the French and English colonists in North America commenced in 1613, and were only interrupted by brief intervals of truce till 1763, when, by the peace of Paris, Canada was ceded to England, and the settlements of France were confined to the town of New Orleans and a few places on the Mississippi, which were soon after ceded to Spain.

In 1763 the British colonies were in number 13, Virginia, the oldest settlement, having been founded in 1607; Georgia, the newest, in 1732. In 1749 it was estimated that the population of the colonies amounted to 1,046,000.

Immediately after the ratification of the treaty of peace with France, the disputes between the colonies and Great Britain commenced. In April, 1764, an act was passed by the British parliament, which levied certain stamp-duties and sugar-duties. This act was resisted by the colonies, was never enforced, and was repealed in 1766.

The repeal however was accompanied by a declaratory act, asserting the right and power of the British legislature to bind the colonies in all cases whatever. In conformity with this declaration an act was passed in 1767, imposing a duty on paper, glass, painters' colours, and teas, to be paid by the colonists in the colonies. This act was met on the part of the Americans with the same determined spirit of resistance as the Stamp Act. In 1770 Lord North, who had succeeded the Duke of Grafton as premier, prepared a bill to repeal as much of the act of 1767 as imposed duties on glass, paper, and painters' colours, and to continue that part which imposed a duty on tea. Such a trifling alteration could have no effect on the sentiments of the Americans: they objected to the British parliament's right to tax them, not to the amount of the tax.

Though a congress had met in 1765, there was little appearance of concert among the colonies in their opposition to the parliamentary measures of the mother-country till 1774. The resistance was everywhere local, spontaneous, and generally unpreconcerted. In 1772 the colonists of Rhode Island captured the armed government schooner Gaspee. In 1773 the citizens of Boston threw the cargoes of tea, which had been brought into their harbour notwithstanding their non-importation resolutions, into the sea. The destruction of the tea was punished in 1774 by an act of parliament ordering the port to be shut up. The enforcement of this act converted the community of Boston into martyrs for American liberty. Boston became henceforth a central point towards which the sympathies of all America converged—the nucleus of a combination of all the colonies. In June, 1774, the Massachusetts House of Representatives appointed a committee of five persons to meet committees or delegates from the other provinces at Philadelphia on the 1st of September; and delegates from eleven colonies appeared at Philadelphia on the 4th of the month named. The colonies represented were—New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, and Virginia. On the 14th the

deputies from North Carolina arrived. This first congress continued to sit for eight weeks. During that period it prepared and published 'A Declaration of Rights, enumerating the acts by which they had been violated, and declaring a repeal of these acts indispensable to the restoration of harmony between Great Britian and the colonies;' besides addresses, letters, and memorials.

Having transacted this business, Congress dissolved, but not without expressing an opinion 'that another congress should be held on the 10th of May next ensuing, at Philadelphia.' The second Congress met at Philadelphia on the 10th of May, 1775, but before that time hostilities had been commenced by the battle of Lexington in Massachusetts. Before the second Congress dissolved, Georgia had elected delegates; and the members of Congress, despairing of any of the mainland colonies wrested from the French and Spaniards joining their standard, had forbidden all exportations to Quebec, Nova Scotia, and East and West Florida, and prohibited the supply of provisions to British fisheries on the American coast. The third Congress passed a 'Declaration of Independence,' March 4, 1776.

In 1778 the first public audience was given by the King of France to the American ambassadors. In April, 1782, Holland recognised the independence of the United States. In 1783 peace was concluded between Great Britain and the United States. Their independence was recognised, in the course of the same year, by Sweden, on the 5th of February; by Denmark, on the 25th; by Spain, on the 24th of March; and by Russia, in July. Treaties of amity and commerce were concluded with all these nations, and thus the United States of North America took their place among the nations of the earth. The original extent of the territory of the United States was from the British Possessions on the N. to Florida, which had again fallen to Spain, on the S.; and from the Atlantic on the E. to the Mississippi on the W.

A convention, sanctioned by the recommendation of Congress, assembled at Philadelphia, in May 1787, to frame a constitution for the United States. The constitution was framed, and before the close of 1788 all the states except Rhode Island and North Carolina had adopted it. These dissentient states ratified the constitution May 29, 1790.

A quorum of the House of Representatives had met at New York April 1, 1789, and elected a speaker; a quorum of the Senate had met on the 6th, and elected a speaker to count the votes for president. George Washington it was found had been unanimously elected president, and John Adams vice-president, of the United States. Washington took the oath of office on the 30th of April, and opened the proceedings of Congress by a speech. On the 21st of May a resolution was adopted by the House of Representatives to the effect that there ought to be established: 1, a department of foreign affairs, with a secretary at its head removeable by the president; 2, a treasury department, with a secretary at its head, removeable by the president; 3, a department of war, with a secretary at its head, removeable by the president. Bills were brought in to give effect to this resolution, which passed both houses, and were sanctioned by the president. The constitution was now completely in operation. Since that time down to the present day it has only experienced a few immaterial modifications.

Presidents of the United States.

George Washington . . .	1789 to 1797
John Adams	1797 to 1801
Thomas Jefferson	1801 to 1809
James Madison	1809 to 1817
James Monroe	1817 to 1825
John Quincy Adams . . .	1825 to 1829
Andrew Jackson	1829 to 1837
Martin Van Buren . . .	1837 to 1841
William Henry Harrison .	1841 to 1841
John Tyler	1841 to 1845
James Knox Polk . . .	1845 to 1849
Zachary Taylor	1849 to 1850
Millard Filmore	1850

Territory.—The area and population of each of the States of North America are stated under the respective names, ALABAMA, &c.

The following is the list of the States in 1790 and 1840, with the total population of each, including slaves; and also the total number of slaves in each state in 1840 :—

States, &c.	1790.	1840.	Slaves.
Maine . . .	96,540	501,793	0
New Hampshire	141,899	284,574	1
Vermont . . .	85,416	291,948	0
Massachusetts .	378,717	737,699	0
Rhode Island .	69,110	108,830	5
Connecticut . .	238,141	309,978	17
New York . .	340,120	2,428,921	4
New Jersey . .	184,139	373,306	674
Pennsylvania .	434,373	1,724,033	64
Delaware . .	59,098	78,085	2,605
Maryland . .	319,728	470,019	89,737
Virginia . . .	748,308	1,239,797	448,987
North Carolina .	393,751	753,419	245,817
South Carolina .	249,073	594,398	327,038
Georgia . . .	82,548	691,392	280,944
Florida . . .	.....	54,477	253,532
Alabama . . .	.....	590,756	195,211
Mississippi . .	.....	375,651	168,452
Louisiana . .	.....	352,411	19,935
Arkansas . .	.....	97,574	183,059
Tennessee . .	30,791	829,210	182,258
Kentucky . .	73,077	779,828	3
Ohio	.....	1,519,467	0
Michigan . .	.....	212,267	3
Indiana . . .	.....	685,866	331
Illinois . . .	.....	476,183	58,240
Missouri . . .	.....	383,702	4,694
Dist. Columbia .	.....	43,712	25,717
Wisconsin . .	.....	30,945	11
Iowa	.....	43,112	16
Total . . .	3,929,827	17,063,353	2,487,355

The following is a list of the most populous towns of the United States, with the population of each in 1840 :—New York, 312,710: Philadel-

phia, 228,691; Baltimore, 102,313; New Orleans, 102,193; Boston, 93,383; Cincinnati, 46,338; Brooklyn, 36,233; Albany, 33,721; Charleston, 29,261; Washington, 23,364; Providence, 23,171; Louisville, 21,210; Pittsburg, 21,118; Lowell, 20,796; Rochester, 20,191; Richmond, 20,153; Troy, 19,334; Buffalo, 18,213.

Government.—The United States at the time of the formation of the General or Federal Government in 1787, consisted of thirteen distinct States,—Massachusetts, New Hampshire, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, and Georgia. The number is now increased to 31 by the successive additions of the following States: Vermont, Kentucky, Tennessee, Ohio, Louisiana, Indiana, Mississippi, Illinois, Alabama, Maine, Missouri, Arkansas, Michigan, Florida, Texas, Iowa, Wisconsin, and California.

Besides the States above named there are two territorial governments, the *Oregon Territory* and the *Minesota Territory*, and also the *District of Columbia*. There is probably by this time (Nov. 1850) a *Territory of New Mexico*.

They formed a Federal Government for defence from foreign aggression, and tranquillity at home; to encourage and protect commerce; and for a few objects of internal legislation in which uniformity among the States was desirable, and an obvious and direct common interest existed. To the separate States was left the legislation which concerns the law of property, the punishment of offences, the administration of justice, and the exercise of all powers over the territory and the citizens, except those powers which have been either expressly withdrawn from the States, or delegated to the General Government.

By the written instrument called the Constitution of the United States, the power of the General Government is divided into three branches; the legislative, executive, and judicial.

The House of Representatives is chosen every second year by those whom the laws of each State empower to vote. The number of representatives has been gradually increased from 65, in 1789, when the constitution went into operation, to 232 (including California, which has been made a State this year, 1850, and probably sends 2 representatives). The representatives must be apportioned among the States according to their population, deducting for the slave-holding states two-fifths of the slaves in the estimate; and a census of the inhabitants is taken every ten years, at which time a new apportionment takes place, and a new ratio of population to each representative may be then also adopted, or the former one be continued. The act of Congress of 1842 declares that there shall be 'one representative for every 70,680 persons in each State, and one additional representative for each State, having a fraction greater than one moiety of the said ratio, computed according to the rule prescribed by the constitution of the United States.'

The Senate consists of two members from each state, chosen by its legislature, and consequently the whole number is now 64. One third of the members are elected every second year, so that each member holds his seat for six years. In both houses the members are re-eligible.

All acts of legislation require the concurrence of both houses, which constitute the Congress of the United States. They have the power of levying taxes for all national objects pursuant to the powers given them by the constitution; of regulating commerce; of coining money; fixing the standard of weights and measures; establishing post-offices and post roads; prescribing a uniform rule of naturalisation, and a uniform bankrupt law; creating and supporting an army and navy; of declaring war; defining and punishing treason, piracy, counterfeiting and other offences arising under the constitution and acts of Congress; exercising exclusive legislation in the district of Columbia in which Washington, the seat of the General Government, is situated, and in forts, arsenals, dockyards, and all the territories belonging to the General Government; and the power of admitting new states into the union. The powers of the Congress are expressly limited in several matters by the Constitution.

Congress must assemble at least once in every year, which of late has been on the first Monday in December. The members of both houses receive eight dollars for each day's attendance on congress, and also for every 20 miles which they must travel to the seat of government at Washington, and in their return home.

The executive power is vested in a President, who is commander-in-chief of the army and navy, collects and disburses the revenue according to law, and makes treaties with foreign nations; but in the exercise of the treaty-making power, the concurrence of two-thirds of the senators present is required. He nominates and, with the advice and consent of the senate, appoints ambassadors, other public ministers, and consuls, and judges of the supreme court, and other inferior officers. He has also a qualified negative on the laws enacted by the two houses, which becomes absolute unless it is subsequently countervailed by two-thirds of each house. He is provided with a ready-furnished house, and his salary is 25,000 dollars. He is chosen by a determinate number of electors; the voters in each state elect as many electors as are equal to the members which such state sends to both Houses of Congress. Every state has its own electoral college, and all the colleges give their votes on the same day, and by ballot. The votes are sent sealed to the President of the Senate. If no person has a majority of the electoral votes, the election devolves upon the House of Representatives, in which case all the representatives of a state give but one vote. The president must be thirty-five years of age and a native American; and he is re-eligible for life, but the usage has been never to elect the same person for more than two terms of four years each.

The executive business is distributed among four departments; that of the state, of the treasury, of war, and of the navy; the four secretaries of which, with the attorney-general, compose the president's cabinet council.

The Vice-President is chosen at the same time and in the same way as the president, to whose office, if vacated during the term for which he was elected, he succeeds. His function as vice-president is to preside over the deliberations of the senate, in which he has a casting vote, which is given when the votes of the senators are equal.

The judicial power is vested by the constitution in a supreme court, and such inferior tribunals as Congress may from time to time establish. The supreme court consists of a chief-justice and eight associate justices. It sits in Washington, and has one session annually, which commences on the first Monday in December. The United States are divided into nine judicial circuits, in each of which a circuit court is held twice every year, for each state within the circuit, by a justice of the supreme court assigned to the circuit, and by the district judge of the state or district in which the court sits. There are also district courts, of which each state contains one, and some of them two; and each of these district courts has a separate judge, with some few exceptions, where one judge presides in several district courts in the same state. The several courts have either original or appellate jurisdiction in all admiralty cases, breaches of the revenue laws, controversies between citizens of different states, or citizens and foreigners; cases affecting ambassadors and other public ministers; and in all cases criminal or civil, in law or equity, arising under the constitution or the laws of the United States. The judges all hold their offices during good behaviour; and their salaries, which vary from 5000 to 1000 dollars, cannot be diminished even by the legislature during their continuance in office. All public officers are removeable by impeachment, and the senate is the tribunal for the trial of impeachments; but the judgment in these cases extends no further than to removal from office.

The Constitution provides for its own amendment, whenever such amendment shall be proposed by two-thirds of both Houses of Congress, or by a convention called on the application of two-thirds of the states: but in either case, the amendment must be ratified by three-fourths of the states to give it effect.

The Constitution also imposes express restrictions on the state governments. They cannot enter into a treaty or alliance; coin money; emit bills of credit; make anything but gold and silver a legal tender; pass a bill of attainder or *ex post facto* law; impair the obligation of contracts; grant any title of nobility; lay a duty either on imports or exports; nor can they without the consent of Congress, enter into a compact with another state; keep troops or ships of war in time of peace; nor engage in war, except in case of invasion or of similar urgency.

The state governments, with a few great features in common, have great diversities in their laws, and in their written constitutions. In all of them, the legislative, executive, and judicial powers are separate. The legislature in all the states consists of two branches; one usually called the Senate, and a more numerous branch, which is variously designated.

In all the states the executive power is vested in a Governor, who in some of the states is assisted by a council. His powers vary in the different states. He is chosen by the people in all the states, except in Maryland, Virginia, North and South Carolina, in which he is chosen by the legislature. His term of service varies in the different states from one to four years, and he is in some states re-eligible, and in others not.

The appointment, salaries, and terms of office of the judges vary in the different states. In most of them the judges hold their offices during good behaviour. Some states have separate chancery courts; in others the courts of common law exercise equity jurisdiction.

The proportion in which negro slavery existed in 1840 is shown in the preceding Population Return. In some of the states slavery either never had existence, or has been abolished, except as to those who were slaves at the time of the abolition.

The right of suffrage has various restrictions in the different states as to property, residence, and length of citizenship; but it is now nowhere limited to an interest in land. In all the states the votes are given by ballot, except in Virginia, Kentucky, and Arkansas, where they are given orally. The common law of England is the law of every state, so far as it has not been changed by the legislature, except in Louisiana, where the laws have been digested into one code.

The amount of revenues of the several states varies according to their population and wealth. In general a sum equal to the annual expenditure is raised by taxes within the year, in which case it rarely averages more than a dollar for each inhabitant, and sometimes it is not one-fourth of that sum. But besides the taxes paid into the state treasuries, the county courts of the state or other corporate bodies have the power of levying money for special local objects, as for making and repairing roads, for providing court-houses, and gaols, for the support of schools, &c., the amount of which taxes sometimes equals and even exceeds the state tax.

Besides the 31 states which constitute the Federal Union, there are Territories beyond their limits which are immediately subject to the general government. Over these the legislative power of Congress is supreme; but it is so exercised as gradually to fit them for admission into the Union. At first they are administered by a governor, appointed by the federal executive.

The revenue of the general government arises from the sale of public land, custom-duties, and the post-office. The whole produce of the post-office department is absorbed by the expenditure in that department. The sale of public land has produced for many years a very large revenue.

The public land consists, first, of the lands which, having been once national domain by purchase, have never been sold or ceded by the General Government, and of which there are yet large bodies in most of the western states, and in the territories; and secondly, of those lands in the unsettled western territory, which have been more recently purchased of the Indians.

Statistics.—In the year ending June 30, 1848, the total revenue of the United States amounted to 58,394,701 dollars, of which 31,757,070 dollars were derived from the customs-duties. The total expenditure amounted to 58,241,167 dollars.

In 1848 the total debt of the general government amounted to 65,804,450 dollars. The total debt of all the states, Jan. 1, 1849, amounted to 211,252,432 dollars.

In 1848 the total imports amounted to 154,977,876 dollars; the total exports to 154,032,131 dollars. The whole value of the coinage for the year 1849 was 11,164,696 dollars, of which the value of about 6,000,000 dollars consisted of gold from California. The total amount of gold received from California at the United States Mint, Philadelphia, and the Branch Mint, New Orleans, from the first arrivals up to Aug. 1, 1850, amounted to 20,934,310 dollars.

The following list of religious denominations has been compiled from returns made in 1844–49, and by estimates :—

NAMES.	Ministers.	Communicants.
Roman Catholics	917	1,190,700
Protestant Episcopalians . .	1497	67,550
Presbyterians, Old School .	1860	200,830
Presbyterians, New School .	1453	139,047
Cumberland Presbyterians .	350	50,000
Other classes of Presbyterians	293	45,500
Dutch Reformed	289	32,840
German Reformed	273	70,000
Evangelical Lutherans . .	663	163,000
Moravians	24	6,000
Methodist Episcopal . . .	5042	1,112,756
Methodist Protestant Church	740	64,313
Reformed Methodists . . .	75	3,000
Wesleyan Methodists . . .	600	20,000
German United Brethren .	500	15,000
Allbright Methodists . . .	250	15,000
Mennonites	250	58,000
Orthodox Congregationalists .	1687	197,196
Unitarian Congregationalists .	250	30,000
Universalists	700	60,000
Swedenborgians	30	5,000
Regular Baptists	5142	686,807
Six-Principal Baptists . . .	25	3,586
Seventh-Day Baptists . . .	43	6,243
Free-Will Baptists	1082	56,452
Church-of-God Baptists . .	128	10,102
Campbellites	848	118,618
Christian Baptists (Unitarians)	498	3,040
Anti-Mission Baptists . . .	907	67,845

In 1849 the Regular Army of the United States consisted of 9438 non-commissioned officers and privates, and 882 commissioned officers: total, 10,320. In 1849 the Militia consisted of 1,761,364 non-commissioned officers and privates, and 69,503 commissioned officers: total, 1,914,101.

In August, 1849, the United States Navy consisted of 11 ships of the line (10 of 74 guns and 1 of 120); 12 first-class frigates (44 guns); 22 sloops of war (16, 18, and 20 guns); 4 brigs (10 guns); 8 schooners (1 and 2 guns); 14 steamers (1 to 10 guns); 6 storeships (4 to 6 guns). The aggregate burthen of the vessels belonging to the United States amounted to 3,150,502 tons. In 1849 the total length of railways was 6117 miles.

There were in the United States, in 1840, 4,335,669 horses and mules; 14,971,586 cattle; 19,311,374 sheep; 26,301,293 swine. There were produced 84,823,272 bushels of wheat; 4,161,504 of barley; 123,071,341 of oats; 18,645,567 of rye; 7,291,743 of buckwheat; 377,531,875 of Indian corn; 35,802,114 lbs. of wool; 108,298,660 bushels of potatoes; 10,248,108 tons of hay; 219,163,319 lbs. of tobacco; 80,841,422 lbs. of rice; 790,479,275 lbs. of cotton.

UNIVERSAL AND PARTICULAR. A proposition is *universal* when it makes its assertion or denial about every one of the things spoken of; and *particular* when it makes such an assertion or denial of some as implies that others are not spoken of. Thus 'all men are mortal' is universal, and also 'no man is perfect.' But 'some men are born in England' and 'some animals cannot live in this climate' are particular. These are the strict logical forms, but it often happens that the universal and particular characters are expressed by a great variety of idiomatic turns, and that even forms of expression which, literally speaking, imply universality, are used in a particular sense. Thus 'men do not willingly abandon life' strictly means that all men are unwilling to quit life. Nevertheless it would be generally understood to speak of most men, or of all except a few. Except when speaking of laws of nature or necessary conditions of the mind, few writers have much occasion for universal propositions, and consequently the forms of speech which belong to *all*, pass into use when the proposition is intended to be predicated only of *most*.

UNIVERSE. This name is generally used, as the word World once was, to signify the collection of all created things. In modern language, the World generally refers to the earth only, and the Universe to all stars and planets. Before the reception of the Copernican theory, 'the world,' which signifies what we now call the universe, was naturally a synonyme for 'the earth,' which was supposed to be the principal part of the universe, all the other celestial bodies being only satellites. But since the time when other planets have been advanced to the dignity of being separate worlds, the term universe has been gradually introduced into common language. It would almost seem as if this last word might one day become more particular in its meaning, since modern discoveries seem to point out that every nebula may be 'a universe,' that is, an organisation as extensive as the idea which was formed of the universe previously to those discoveries. If such should ever be the case, and if people should speak of thousands of universes as they now speak of thousands of worlds, some new term must be introduced under which to comprehend all those universes.

By the technical term *Theory of the Universe* is always understood what is known of the general

arrangement of planets, stars, &c., and of their connection with one another.

UNIVERSITIES are lay corporations, which, since the 12th century, have had the charge of educating the members of the learned professions throughout Europe and the colonies founded by European states. The three oldest learned institutions to which the name University can with propriety be applied are those of Paris, Bologna, and Salerno.

The name Universitas was not confined in the middle ages to scientific bodies; it was used in a sense equivalent to our word Corporation, or nearly so, and this is the Roman sense of the word. It was long before the name obtained its present limited acceptation. The oldest document in which the designation 'universitas' is applied to the university of Paris is a decretal of Innocent III., about the beginning of the 13th century.

To almost every cathedral and monastery of Europe there had been, from a very early period, attached a school, in which all candidates for priestly orders, and such laymen as could afford it, were instructed. It appears from the letters of Abelard (died 1142), and from other contemporary sources, that in Paris the poorer establishments intrusted the conduct of this school to one of their number called the Scholasticus; and that the wealthier bodies maintained a Scholasticus to instruct the junior pupils in grammar and philosophy, and a Theologus to instruct the more advanced in theology. About the time of Abelard the great concourse of students who flocked to the episcopal school of Paris appears to have rendered it necessary to assemble the two classes of pupils in different localities; the juniors were sent to the church of St. Julian, while the theologians remained in that of Notre Dame. All who had studied a certain time, and undergone certain trials, were entitled to be raised by the rector of the schools to the grade of teachers. This was done by three successive steps. The candidate was first raised to the rank of master, in which he acted for a year as assistant to a doctor (or teacher); then to the rank of baccalaureus (bachelor), in which he taught for a year, under the superintendence of his doctor, pupils of his own; lastly, to the grade of independent doctor. According to the custom of those times, the teachers gradually formed themselves into a kind of corporation for mutual support. The corporation consisted of the teachers of all the three grades, and stood under a rector elected by themselves. According to an agreement entered into in 1206, the rector was elected by the residents of the four nations—French, English or German, Picards, and Normans. The disputes between the teachers of theology and the other teachers ended in the secession of the doctors of theology from the university, as it had for some time been called, and their incorporating themselves into a separate college or faculty. Their example was followed not long after by the doctors of canon law and medicine, who formed themselves into separate faculties. These faculties consisted exclusively of the actually teaching doctors (doctores regentes) of these three branches of knowledge. The masters and bachelors remained

members of the university proper, which, from the secession of the theologians, canonists, and doctors of medicine, came in time to be called the Faculty of the Artists. From this period the university consisted of seven bodies or sub-incorporations—the four nations under their procurators, and the three faculties under their deans. The rector was the head of the university; he was elected by the procurators of the old university; no doctor of theology, canon law, or medicine could be elected or take part in the election. At first the rector was chosen by the procurators, but latterly by four electors, specially elected by each nation for that purpose. At an early period colleges were established within the university of Paris by private families or religious orders. Originally they were intended exclusively for poor scholars, who were to live in them subject to a certain discipline. By degrees, as more numerous and able teachers were employed in these colleges, they assumed the character of boarding-houses for all classes of students.

The oldest authentic document relating to the university of Bologna is the privilege granted by the Emperor Frederick I., at Roncaglia, in November, 1158, to all who travel in pursuit of learning, in which the professors of law are mentioned in terms of high encomium. Bologna is not named in this instrument, but history mentions no other law-school as existing at that time. The contents of this privilege are two-fold: foreign scholars are declared to stand under the emperor's immediate protection, and a special jurisdiction (their teachers, or the bishop of the city) is constituted to judge in all complaints against them. It seems universally admitted that the earliest teacher of civil law at Bologna was Irnerius: he is said to have been originally a teacher of philosophy, but to have acquired such a knowledge of Justinian's compilations that he was invited by the Countess Matilda to expound its doctrines from the professional chair. The fame of the university of Bologna rests on its law teachers; and from this school the study of the Roman law has been spread over Europe.

Ordericus Vitalis, whose annals close with the year 1141, speaks of Salerno as a place long eminent for its medical schools. Its most celebrated teacher, Constantine of Carthage (died 1087), was a privy councillor of Louis Guiscard. This school was still flourishing in 1224, when the university of Naples was established. All that can be inferred from these scanty notices of the school of Salerno is, that the scientific study of medicine was making rapid strides about the same time that law began to be more systematically studied, and philosophical and literary pursuits to be regarded as the profession of a class whose members might or might not be priests.

This sketch of the early constitution of the universities of Paris and Bologna will assist a person in acquiring a more exact notion of the original constitution of other universities.

The growth of universities throughout Europe was rapid. Before the Reformation they were established in Italy, France, the Germanic Empire, the Peninsula, Great Britain, and even among the

Slavonic nations east of the Germans. There were numerous universities established in Italy previous to the year 1500, besides the three already named; within the limits of the Germanic Empire, which then extended over many provinces now incorporated into France, and over the Netherlands; in Great Britain; in Spain and Portugal; in Sweden at Upsala in 1476; and at Copenhagen in 1479.

In all of these institutions we recognise the leading features of Paris or Bologna. All of them are privileged corporations, with an independent jurisdiction more or less limited, and the power of making bye-laws. In all of them the faculties of philosophy (or arts), theology, law (civil and canon), and medicine, are more or less fully developed. Some contain within them all the faculties; some only two or more.

The universities founded after the Reformation adopted in general the organization of their predecessors—the political incorporation, the privileged jurisdiction and power of making bye-laws, the faculties and modes of conferring degrees which custom had established. But the altered circumstances of society modified considerably their external relations. The same political power was not conceded to universities that had formerly been given to them. The old were restricted in their privileges; the new never received them. Other sciences also had their practical utility recognised, in the same way as the sciences of law and medicine had theirs at an earlier period. The applications of mathematical science to the purposes of war and navigation had given an impetus to their cultivation: these new practical pursuits never produced a new faculty, but they lent greater importance to the miscellanous faculty known as the Faculty of Arts. The number of universities founded in Europe, from the time of the Reformation down to the French Revolution, was considerable. They were established in Italy, France, Germany, in the United Provinces of Holland, in Scotland, Ireland (Dublin), in Spain and Portugal, and elsewhere.

Many events concurred during this period to lower universities in the public estimation. The extension of elementary and secondary schools had raised the standard of education among the classes which did not receive a university education. The invention of printing had operated in the same direction. The diminished privileges and restricted jurisdiction of universities had brought them to be regarded merely as schools of a higher order. The increasing number of learned societies raised up a body of non-academical literati, hostile in many instances to the academical; and the public, looking only to the transactions of these societies, forgot that their members were indebted for their training to the universities. In France the old universities have entirely disappeared. In the rest of Europe, as soon as the storms of the Revolution were passed over, they revived; and, adapting themselves more to the social necessities of the age, have in many instances started with increased energy on a fresh career of utility.

The present university system in France is peculiar. It is a kind of system, though a very incomplete one, of what is commonly called National Education, which it would require much space to explain in a satisfactory manner.

The universities of Great Britain are Oxford, Cambridge, Durham, London, St. Andrew's, Glasgow, Aberdeen, Edinburgh, Dublin. In Oxford and Cambridge the colleges have obtained a complete preponderance over the university, and the old university constitution is in practice changed. So great has been the change that many people, and even some learned judges, have erroneously conceived these two corporations as composed of a number of colleges something like a federal government, whereas the universities are distinct lay corporations, which confer degrees and have various powers: the colleges are properly boarding houses and eleemosynary foundations. [College.] The earliest charter of privileges to the university of Oxford as a corporation is said to be the 28th of Henry III., and the first charter granted to the university of Cambridge as a corporation is said to be the 15th of Henry III. James I., in 1603, by diploma dated the 12th of March, granted to the universities of Oxford and Cambridge the power to send each two representatives to the House of Commons. The Dean and Chapter of Durham, by an act of chapter, 28th of April, 1831, established an academical institution in Durham in connection with the cathedral church, which by an act of parliament (2 & 3 Wm. IV.), entitled 'An Act to enable the Dean and Chapter of Durham to appropriate part of the property of their church to the establishment of a university in connection therewith for the advancement of learning,' was confirmed and endowed. In 1837 the university of Durham received a royal charter. The university of London received its first charter from William IV., which Queen Victoria revoked in the first year of her reign, and granted a new charter the 5th of December, 1837. [University College; University of London.]

As in England and Scotland, the medical and legal professions are in the United States educated principally in distinct schools; and this is the case also in a great measure with the students of theology. Many of the colleges or universities contain only a faculty of arts.

According to the 'American Almanac' for 1850, there were 130 colleges in the United States; 36 medical schools, some of which are connected with colleges or universities; 42 theological schools; and 12 law schools. Most, if not all, of these are incorporated places, and all the colleges grant degrees. Many of these colleges are of a very recent date, ill organised, and ill endowed. But the endowments and character of the older colleges in the United States are such as show that the higher branches of learning and science are zealously pursued and honourably supported.

UNIVERSITY ACADEMY. [Department.]

UNIVERSITY COLLEGE, LONDON. [University of London.]

UNIVERSITY COLLEGE, OXFORD, was founded by William of Durham, rector of Bishop-Wearmouth, who died in 1249, leaving a sum of money to provide a permanent endowment for the maintenance of Masters, with a preference to

persons born in the parts nearest to Durham. The first purchase with this bequest was made in 1253, and the first statutes are dated in 1280, which year may be considered as that of the permanent foundation of the College. The chief benefactors since that period have been King Henry IV.; Walter Skirlaw, bishop of Durham; Henry Percy, earl of Northumberland; Robert Dudley, earl of Leicester; the Rev. Robert Gunsley; John Frestone, Esq.; Sir Simon Bennet, Bart.; the Rev. Charles Greenwood; Dr. John Radcliffe; and Dr. John Browne.

The present foundation consists of a Master, 13 Fellows, 16 Scholars, some exhibitioners, and a Bible-Clerk.

Of the present buildings of the College, forming two courts, the hall was begun in 1640, but was not completed till the reign of Charles II. The chapel was completed in 1665. The library, on the south side, beyond the principal quadrangle, was finished in 1669. The grand front of this College, with two gateways, each with a tower above, extends upwards of two hundred and sixty feet, and is one of the principal ornaments of the High Street. Statues of Queen Mary and Queen Anne stand above the gateways of the courts toward the street, and others of King James II. and Dr. Radcliffe above the gateways within. Some additional buildings toward the High Street have been since erected.

The king is the visitor of this College. The number of members upon the books in Jan., 1848, was 249.

UNIVERSITY OF LONDON owes its establishment to the formation of what was at first called the London University, and now University College, London, succeeded as it was by the institution of King's College. In order to promote the objects of these schools it was found necessary that a body should be formed, with the power and means of examining the students, and the right of conferring degrees. The original charter was given by King William the Fourth, and was a temporary one. Queen Victoria, in the first year of her reign, revoked the first charter, and granted a new one. This second charter bears date Dec. 5, 1837, and is for the purpose of ascertaining by means of examination the persons who have acquired proficiency in literature, science, and art, and of rewarding them by academical degrees. By this charter the university consists of a Body of Fellows, including a Chancellor and Vice-Chancellor, who compose a Senate. The king is the visitor, and to the crown is reserved the power of from time to time appointing any number of Fellows; but in case the number shall be at any time reduced below twenty-five, exclusive of the Chancellor and Vice-Chancellor, the Members of the Senate may elect twelve or more persons to be Fellows in order to complete the number of thirty-six Fellows, besides the Chancellor and Vice-Chancellor. The Chancellor is to be appointed by the crown. The office of Vice-Chancellor is an annual one, and is filled by election by the Fellows from their own body.

An examination for degrees must be held once a year at least. The candidates are to be examined in as many branches of general knowledge as the Senate shall consider most fitting. The examiners are to be appointed by the Senate, either from their own body or otherwise. The Senate confers, after examination, the degrees of Bachelor of Arts, Master of Arts, Bachelor of Laws, Doctor of Laws, Bachelor of Medicine, and Doctor of Medicine. The successful candidates are to receive certificates under the seal of the University, and signed by the Chancellor, in which the particulars declared by the examiners are to be stated.

A candidate for degrees is entitled to examination on producing a certificate that he has completed the course of instruction required by the University. For degrees in Arts and Laws the following places are entitled to grant certificates:—

The Universities of the United Kingdom.
University College, London.
King's College, London.
St. Cuthbert's College, Ushaw.
Stonyhurst College.
Royal Belfast Academical Institution.
Manchester New College.
St. Mary's College, Oscott.
St. Patrick's College, Carlow.
St. Edmund's College, near Ware.
Homerton Old College.
Highbury College.
Colleges of St. Peter and St. Paul, at Prior Park, near Bath.
Spring Hill College, Birmingham.
Stepney College.
College of St. Gregory the Great, Downside, near Bath.
Countess of Huntingdon's College, at Cheshunt.
Baptist College at Bristol.
Airdale College, Undercliffe, near Bradford.
Protestant Dissenters' College, Rotherham.
Presbyterian College at Carmarthen.
St. Kyran's College, Kilkenny.
Huddersfield College.
Lancashire Independent College.
Wesley College, near Sheffield.
Queen's College, Birmingham.
Wesleyan Collegiate Institution at Taunton.
Western College, Plymouth.
West of England Dissenters' Proprietary School, Taunton.
St. Patrick's College, Thurles.

For Medical Degrees, both Bachelor and Doctor, the following places are entitled to give certificates:—

Birmingham.—Queen's College and General Hospital.
Bristol.—Medical School, Infirmary, and St. Peter's Hospital.
Haslar.—Royal Naval Hospital.
Hull and East Riding of York.—School of Medicine and Anatomy.
Leeds.—School of Medicine and General Infirmary.
Leicester.—Infirmary.
Liverpool.—Infirmary, and Fever Hospital and Infirmary.
London.—University College, King's College

London Hospital, Middlesex Hospital, Aldersgate School of Medicine, School of Anatomy adjoining St. George's Hospital, Charing Cross Hospital, St. Thomas's Hospital, St. Bartholomew's Hospital, Westminster Hospital, Guy's Hospital, St. George's Hospital, Physicians of the St. Marylebone Infirmary, and Royal College of Chemistry.

Manchester.—Royal School of Medicine and Surgery, Union Hospital, Royal Infirmary, and Robert Smith, Ph.D., Lecturer in Chemistry.

Newcastle-upon-Tyne.—School of Medicine and Surgery.

Nottingham.—General Hospital.

Sheffield.—Medical Institution.

York.—School of Medicine.

Aberdeen.—King's College and University.

Edinburgh.—University, Minto House Dispensary, and Royal Infirmary.

Glasgow.—Andersonian Institution and Infirmary.

Belfast.—Royal Academical Institution.

Cork.—Recognised School of Medicine, and North and South Infirmaries.

Dublin.—Original School of Anatomy, Medicine, and Surgery, School of Physic, Apothecaries' Hall, School of Medicine, Richmond Hospital School of Anatomy, Medicine, and Surgery, Theatre of Anatomy and School of Surgery, St. Vincent's Hospital, Mercers' Hospital, Jervis Street Hospital, School of Anatomy, Surgery, and Medicine, Royal College of Surgeons, Meath Hospital, City of Dublin Hospital, Coombe Lying-in Hospital, and Dr. Steevens's Hospital.

Maryborough.—Queen's County Infirmary.

Malta.—University.

Ceylon.—Military Hospital.

Bengal.—Medical College.

Canada.—University of M'Gill College, Montreal.

The Senate holds its sitting in Somerset House, in apartments formerly occupied by the Royal Academy. The Earl of Burlington, appointed Chancellor by the original charter, still holds that office. Mr. Lubbock, now Sir J. W. Lubbock, was the first Vice-Chancellor, and continued to be elected to that post until he resigned, and Mr. John G. Shaw Lefevre was chosen as his successor, and now fills the office. The executive officer of the Senate is the Registrar.

The various examinations for Arts, Laws, and Medicine, are held yearly, but at different times. There are thirteen Examiners in Arts, one in Laws, and eleven in Medicine. The Examiners receive salaries fixed by the Senate, subject to the approval of the ministers of the crown. The expenses are defrayed, partly by a grant from the government, and partly by the fees paid by students on examination. There are a few scholarships in the gift of the University, and some other rewards for proficiency in the various branches of study.

King's College is one of the colleges dependent on the University of London. It was commenced in 1828, and incorporated by charter in 1829. For the reception of students, the governors completed the eastern wing of the river front of Somerset House, and the college was opened in 1831. The characteristic feature of this institution is that it is peculiarly a Church of England school. It is supported by a proprietary, and by fees. The students do not reside in the College buildings, but attend daily. There are Professorships of Divinity, Religious Instruction, Greek and Latin, Mathematics, English Literature and Modern History, Chinese, Hebrew, French, German, Italian, and Oriental Language, Vocal Music, Drawing, and Fencing; and the Arts of Construction, Manufacturing Art and Machinery, Land Surveying, Geometrical Drawing, Chemistry, Geology, Mineralogy, &c.; with all the usual branches of Medical Science. There is also a junior department for boys between nine and sixteen years of age; and there are now fifteen other schools established in various parts of the country in connection with King's College.

The College buildings extend from the Strand to the Thames. They comprise lecture-rooms, a chemical laboratory, a workshop, museums of anatomy, materia medica, zoology, botany, geology and mineralogy, and libraries, besides a dining-hall, apartments for a limited number of students, and various offices. The school-rooms are in the basement story.

There are several small endowments by benefactors of the college. Among them are the Worsley endowment for the instruction in every department of two scholars, to whom a stipend of 25*l.* a year is paid, and who, on the completion of their studies, are sent out as missionaries; and there are several others for prizes for proficiency and good conduct. Three scholarships have been founded for matriculated medical students. The Master and Fellows of Magdalene College, Cambridge, have given an exhibition for students of the College. In 1835, Mr. Marsden left to the College a valuable library of about 3000 volumes, chiefly in Oriental literature and philology. An hospital, in a great degree founded and supported by members of the college, has been established in Carey Street, Lincoln's Inn Fields, in order to afford facilities in the education of the medical students.

University College, London, had its origin in a project, which was first promulgated in the year 1825, for founding a University in London by means of public subscription. One of its main objects was to afford the opportunity of obtaining a university education to the various classes of society in England who, not being members of the Church of England, were excluded in a greater or less degree from Oxford and Cambridge.

The proposal was favourably received. In a few months the funds were raised by subscriptions for 100*l.* shares, and by a few donations of 50*l.* each. In the autumn the site on which the College now stands was procured; the first stone was laid on the 30th of April, 1827, by his Royal Highness the Duke of Sussex, and by the end of 1828 the institution was in full operation.

In 1830 an application was made to the crown for a charter, but the grant was successfully opposed by the universities of Oxford and Cambridge. In 1833 the application was renewed, as was also the opposition, with the ad-

ditional opposition of the College of Surgeons: the case was heard before the Privy Council in 1834, but before a decision was obtained a change of administration took place, and the question remained undecided, when, in March, 1835, on a motion by Mr. Tooke, the House of Commons voted an address to his Majesty, in opposition to the ministers, praying him to grant a charter. King William replied that the Privy Council should be called on to report, but still nothing was done until Lord Melbourne succeeded again to office, when, in August, 1835, the Chancellor of the Exchequer (the present Lord Monteagle), made a proposal for founding a University of London for the purpose of examining and granting degrees not only to students in this college, but to others of all religious persuasions without distinction, and without the imposition of any test or disqualification whatever. The proposal was agreed to, and carried into effect in the following year [UNIVERSITY OF LONDON], and on the same day this College received a charter under the title of University College, London.

The Council, consisting of the President (Lord Brougham, who had been an active supporter of the project from its commencement), the Vice-President, and twenty-one members, has the general management of the affairs of the College. The Senate consists of the Professors of the College, with a President, and two Vice-Presidents, and they determine on the course and regulate the time of instruction. There are twenty-two professorships in Arts and Laws, and fourteen in the various branches of the Medical Art. There is also an hospital erected in 1834 on part of the ground belonging to the College, by public subscription, chiefly among the proprietors, at the cost of about 10,000*l.*, for the purpose of affording the medical students clinical instruction under the superintendence of the professors. It is supported by public contributions.

An endowment made to the College in 1836 by Mrs. Mary Flaherty has enabled the Council to establish four annual scholarships of 50*l.* a year for four years, of which one is awarded every year to the best proficient in mathematics and classical learning alternately.

A second endowment enjoyed by the College is of the value of 3000*l.* consols, received at various times, from a benefactor under the title of 'Patriot.' It is placed at the disposal of Lord Brougham, who has applied the dividends to the maintenance of classes by the professors of Latin, Greek, Mathematics, and Natural Philosophy, for the instruction of schoolmasters of unendowed schools and of ushers, on the payment of a trifling additional fee. Attendance on these classes for two years is a qualification to be a candidate for degrees at the university of London. The number of attendants on this class is usually between thirty and forty. This employment of the funds was adopted on the recommendation of Lord Brougham.

The College is entitled to other endowment-funds, only a portion of which is yet in actual possession, to the amount of about 36,000*l.*

The Junior School of the College is under the control of the Council, and is conducted by a head master appointed by them, who has the rank and privileges of a professor in the College.

According to the original design the College was to have consisted of a centre and two wings, forming three sides of a quadrangle. Of these the centre and a portion only of the north wing have been erected. These extend a length of about 400 feet. The front is of two floors, constructed in freestone, with a Corinthian order of pilasters on the upper story. The grand entrance is by a pseudo-triprostyle portico, of rich architectural character, of the Corinthian order, having ten columns in front. It is elevated on a lofty stylobate ascended by flights of steps, and leads to an octangular vestibule surmounted by a dome which externally rises behind the pediment of the portico. The vestibule is the ante-room to a grand hall. The lecture rooms are four semicircular theatres, each 65 feet by 50; four oblong rooms, each 46 feet by 24; with other class-rooms of smaller dimensions. There are two spacious laboratories for chemistry and pharmacy. On each hand of the vestibule on the upper story is a room 120 feet by 50; one of which has been divided into class-rooms for the junior school. The portion of the north wing that has been built contains the general library. The Chinese library collected by the late Dr. Morrison is possessed by this college: it contains about 10,000 volumes. The museums of philosophical apparatus, of chemistry, anatomy, and of natural history, are amply provided for the purposes of instruction. The portion of the building on the south side of the portico is devoted to instruction in the subjects of the Faculty of Arts and Laws; that on the north side, to the subjects of the Faculty of Medicine. In the east court of the north end is a spacious well-lighted hall, 95 feet long, 28 wide, and 24 high, for the study of practical anatomy, and adjoining is a laboratory fitted up for the instruction in practical chemistry and in chemical manipulations, distinct from other laboratory pursuits.

UNLIMITED. This term is frequently used by mathematical writers, in the same manner as *Indefinite*, to avoid the entrance of the word *Infinite*. It is also used to describe a problem which may have an infinite number of answers, and which is called an Unlimited Problem.

UNO'NA, a genus of the natural family of *Anonaceæ*. The species consist of trees, large shrubs, or climbing plants, found in hot parts of the world, as India and its islands, Africa, and South America. The bark and fruit of many of the species are aromatic, with some degree of acridity, and are employed as stimulating medicines or as condiments. *U. Æthiopica*, a native of Ethiopia and Sierra Leone, has obtained more celebrity than other species, from being supposed to be that which yields the seeds formerly well known under the name of Ethiopic Pepper.

UNTERWALDEN, a canton of Switzerland, is bounded N. by the Waldstätter See, or lake of Luzern, W. by Luzern, S. by the Bernese Oberland, and E. by Uri. The area is about 265 square miles, and the population by the census of March, 1850, was 25,138. It consists mainly of two parallel valleys, each about 15 miles in length, sloping

from south to north, and terminating on the south coast of the Waldstätter See. The eastern valley is drained by the Engelberg Aa, a torrent which flows by the abbey of Engelberg, and enters the lake below Stanz. The western valley is drained by the Sarner Aa (the outlet of the little Alpine lake of Lungern) which, after passing through the lake of Sarnen, enters the Waldstätter Lake below Alpnach. The lower part of the eastern valley constitutes the district called Nidwald, or 'below the forest;' and the western valley, with the upper part of the eastern one, forms the district called Obwald. These denominations relate to the Kernwald, or forest of Kerns, which lies on the border of the two districts. The Obwald and Nidwald have formed two separate communities ever since 1150. They both joined Schwyz and Uri in the insurrection of 1308; and when the first federal union was entered into at Brunnen, in December, 1315, Obwald and Nidwald were recognised as forming together one canton, by the name of Unterwalden. They retained their separate existence as independent communities, but figured as only one canton, having one vote in all federal affairs, and this arrangement has continued in force to this day.

The chief mountain ranges that touch upon Unterwalden are described under SWITZERLAND. In the interior there are no very high mountains, but the surface of the country consists chiefly of hills and terraces, several valleys, and some tracts of plain bordering on the Waldstätter-See. Unterwalden is chiefly a pastoral country; the pastures are mostly natural. There are about 12,000 cows, 3000 sheep, 6000 goats, 3500 pigs, but very few horses. About 20,000 cwts. of cheese are annually made. The canton abounds with fruit-trees; a little bad wine is made. The honey is excellent. The canton imports corn, wine, salt, manufactures, and colonial articles; it exports cattle, cheese, butter, timber, and hides. It is not favourably situated for trade, being confined between the Alps and the lake, with no high road passing through it, and none but mountain-passes leading out of it. Each of the two divisions of the canton has an hospital and a poorhouse. A dialect of the Swiss-German is the language of the country. The Roman Catholic is the religion of the whole canton. The Benedictine monastery of Engelberg, which is more than 3000 feet above the sea, is a foundation of the 11th century. It has a library of 20,000 volumes, and several valuable MSS., a collection of medals, engravings, armorial ensigns, and a grammar-school.

The principal towns or villages are—*Sarnen*, the head town of the Obwald, on the northern extremity of the lake of Sarnen, which has a fine town-house, with several historical portraits, a college, an hospital, and above 1000 inhabitants. The arsenal of Obwald is on the hill called Landenberg, where was once the castle and residence of the Austrian governors. *Kerns*, on the road from Sarnen to Stanz, is a pretty village, with a handsome church, several iron-works, mills, and a cotton-factory. *Stanz*, the head town of the Nidwald, situated in a fine plain at the foot of mountains, has a splendid parish church with a noble dome, and a fine square before it, with two fountains, and a statue of Winkelried, the hero of Sempach. The population of Stanz itself is about 1200; that of the parish exceeds 4500. *Stanzstad*, on the shore of the Waldstätter-See, carries on considerable trade by water.

UPAS TREE. [ANTIARIS.]

UPPINGHAM. [RUTLAND.]

UPSA'LA is a town in Sweden, situated in the province of Upland, and in the Upsala Län, in 59° 51′ N. lat. 17° 30′ E. long. The population does not exceed 4800 individuals; but the town extends over a great area, as there are large gardens to most of the houses. The houses are partly of stone and partly of wood, and mostly two stories high. The streets are wide and straight, especially those that terminate in the spacious square which occupies the centre of the town. The cathedral, which was erected between 1258 and 1435 and is considered the finest gothic building in Sweden, contains monuments to many distinguished persons, among others to Gustavus I. and Linnæus. The square in which the church stands is surrounded by the university buildings, which contains a library of 100,000 volumes, a collection of coins, an anatomical theatre, an observatory, a chemical laboratory, and a very extensive collection of natural objects. There is also a botanical garden. The university, which was established in 1478, has twenty-four regular and fourteen adjunct professors. The Society of Sciences, instituted in 1719, has published several volumes of Transactions. About six miles S.E. of Upsala are the *mora-stones* at which the electors met for the purpose of choosing their king when Sweden was an elective kingdom (1140–1520).

UPTON. [WORCESTERSHIRE.]

UP'UPIDÆ, a family of *Insessores*, or *Perching Birds*, of which the Hoopoe (*Upupa Epops*) is the only European Example. Africa and India respectively present us with two more. The Prince of Musignano, in his 'Conspectus,' places the *Upupidæ* between the *Promeropidæ*, and the *Bucerotidæ* in his third order *Passeres*.

Mr. G. R. Gray makes the *Upupidæ* (*Upupa*, Linn.), the first family of the *Tenuirostres*, consist of the following subfamilies and genera:—

Subfamily 1. *Upupinæ*.

Genera: *Upupa*, Linn.; *Fregilupus*, Less.; *Falculia*, J. Geoffr.; *Neomorpha*, Gould; *Seleucides*, Less.; *Craspedophora*, G. R. Gray; *Ptiloris*, Swainson.

Subfamily 2. *Promeropinæ*.

Genera: *Promerops*, Briss.; *Rhinopomastus*, Smith; *Epimachus*, Cuv.

The *Upupidæ*, in Mr. Gray's arrangement, are immediately succeeded by the *Nectarinidæ*.

Our limits will not permit us to notice particularly in this article more than the genera *Upupa*, *Promerops*, and *Epimachus*.

The European Hoopoe (*Upupa Epops*) is a rare bird in our island; for though it has been known to breed in some counties, yet it is generally in autumn that stragglers on their southern

migration make their appearance. This bird is the ἔποψ (Epops) of the Greeks, *Upupa* and *Epops* of the Romans, *Buba*, *Upega*, *Pubula*, *Bubbola*, *Pupita*, and *Upupa* of the Italians; *Hupe*, *Huppe*, *Putput*, *Huput*, and *Lupoge* of the French; *Wiedehopf* of the Germans, and *Hoopoe* of the British.

Hoopoe (*Upupa Epops*).

Geographical Distribution.—As far north in the summer as Denmark, Sweden, and Russia, and southward in continental Europe, in Germany, Holland, France, Spain, and Italy. It has been seen both at Gibralta, Ceuta, and in Egypt (where it breeds). It is probably an inhabitant of the whole of North Africa. It has been also observed at Madeira and at Trebizond, from which last locality it has been sent to this country.

Habits, Nidification, &c.—In the 'Magazine of Natural History,' it is stated that on the Bourdeaux side of the Garonne and near the city are large spaces of marshy ground, intersected by broad ditches and creeks terminating in the river, where poplars and willows are planted for the sake of their twigs used for tying the vines. These trees being topped become very stout, and as they decay at the centre in a few years, they are attacked by numerous insects, particularly the *Formica fuliginosa*. Here the Hoopoes are frequently seen examining the rotten wood and feeding on the insects which abound therein. It is further remarked, that the Hoopoe flies low and seldom, unless disturbed, its food being so abundant as to require but little search, and that it breeds in a hollow willow about the end of May, the young coming out in June.

Indeed they breed generally in hollow trees, and, notwithstanding the accounts of the disgusting materials which they were said to use, noticed by Aristotle, form a nest of a few dried grass-stalks and feathers, laying eggs ranging from four to seven in number, of a pale lavender gray, about an inch and a half long and eight lines broad.

In a state of nature the Hoopoe is much upon the ground during the day, generally in moist situations, where it may meet with its insect food.

For a very interesting account of the manners of the Hoopoe in captivity, see Bechstein's 'Cage Birds,' and also Mr. Yarrell's 'British Birds.'

We agree with the Prince of Musignano, that the *Promeropidæ* constitute a family quite distinct from that of the *Hoopoes;* nor know we exactly what stress is laid by Mr. Gray in the characters of a subfamily in his system. For ourselves we object entirely to subfamilies; the term in itself involves a contradiction. However, as examples of Mr. G. R. Gray's *Promeropinæ*, we may notice the *Promerops erythrorhynchus*, a splendid bird having a coral-red bill, long and slender, a plumage varying with metallic blue and green, and an elongated tail composed of graduated feathers. This lovely bird lives in small troops in South Africa. Senegal presents us with another variety or species.

Far more gorgeous even than the Red-Billed Promerops is the *Epimachus magnus*, the *Upupa superba* of Latham, and the *Grand Promerops* of Sonnerat. The plumage of this bird is iridescent with steel blue, azure, emerald green, violet, and velvet black. Sonnerat saw the bird in its native forests of New Guinea in 1776. He writes as follows:—

'There does not perhaps exist a more extraordinary bird, or one more aberrant from the idea after which Nature has wrought in this genus, than the Grand Promerops of New Guinea. It is four feet in length from the extremity of the bill to that of the tail. Its body is delicate, slender, and, although it is of an elongated form, appears short and excessively small in comparison with the tail. To add to the singularity of this bird, Nature has placed above and below its wings feathers of an extraordinary form, and such as one does not see in other birds: she seems, moreover, to have pleased herself in painting this being, already so singular, with her most brilliant colours. The head, the neck, and the belly, are glittering green; the feathers which cover these parts have the lustre and softness of velvet to the eye and to the touch; the back is changeable violet; the wings are of the same colour, and appear, according to the lights in which they are held, blue, violet, or deep black, always however imitating velvet. The tail is composed of twelve feathers; the two middle are the longest, and the lateral ones gradually diminish: it is violet or changeable blue above, and blackish beneath. The feathers; which compose it are as wide in proportion as they are long, and shine both above and below with the brilliancy of polished metal. Above the wings, the scapulars are very long and singularly formed; their barbs are very short on one side and very long on the other. These feathers are of the colour of polished steel changing into blue, terminated by a large spot of brilliant green, and forming a species of tuft or appendage at the origin of the wings. Below the wings spring long curved feathers directed upwards. These are black on the inside, and brilliant green on the outside. The bill and the feet are black.' ('Voyage à la Nouvelle Guinée.')

URAL, a river which forms part of the eastern boundary of Europe, rises in the Ural mountains,

near 55° N. lat., at an elevation of 2132 feet above the sea. It first runs S. above 200 miles to the fortress of Orskaja, where it turns to the W., in which direction it passes S. of the town of Orenburg, and continues to flow about 350 miles to the fortress of Uralsk. Near this place it again turns S. and reaches the Caspian Sea after a total course of about 900 miles. At Orskaja, where its level is about 550 feet above the sea, the Ural begins to be navigable for large barges. The river overflows its banks annually. About forty miles from its mouth the Ural divides into two channels, of which the eastern preserves the name of Ural, and the western is called Mokroi Backsai. Lower down the Ural again divides into two channels, of which the western is called Ural, and the eastern Bukharka. The last-mentioned channel is the most convenient for vessels, and on its banks is the fortified town of Guriew. The islands forming the delta of the river Ural are covered with salt-swamps, and entirely unfit for cultivation or pasture. The quantity of fish annually taken in the Ural is very great. The fish ascend the river to the fortress of Uralsk, where their course is stopped by a weir. Belugas (*Accipenser huso*) have been taken in the Ural weighing 1000 lbs., and yielding 200 lbs. of caviar; and common sturgeons weighing 200 lbs., and yielding 40 lbs. of caviar. In summer the fish is salted, but in winter it is exported in a frozen state.

URAL MOUNTAINS, a high range on the eastern boundary of Europe separating European Russia from Siberia. Its southern extremity is on the right bank of the river Ural, near 51° N. lat.; the northern extremity terminates in the Arctic Ocean, opposite the island of Nova Zembla, in about 70° N. lat., 60° E. long. The length of the range is about 1250 miles; near 53° N. lat. its width is about 100 miles, but farther north it narrows to less than 50 miles, and between 56° and 60° N. lat. the width is hardly 20 miles. Farther north it grows wider, but this portion of the range is very imperfectly known. The general elevation of the range is not great, none of the summits rising to more than 6800 feet above the sea, and the highest parts of the range often fall short of 2000 feet. The eastern slope descends rapidly and with steep declivities to the great plains of Asia. On the west the mountains do not immediately border on the great plains of Eastern Europe, but are separated from them by a hilly tract from 20 to 40 miles wide.

The northern portion of the Ural range is bare and naked: the base is granite, the upper stratifications are limestone and quartz, and many erratic blocks are scattered over the surface. The central and southern portions abound in timber, chiefly pines, cedars, larches, and other natives of a northern climate; oak and ash are found in the south-western parts. There are many rich valleys and fine pastures, where great numbers of cattle are bred. Numerous rivers abounding in fish issue from both sides of the chain, the principal of which are the Sosva, the Isset, the Tobol, the Emba, the Ural, the Belaia, the Kama, and the Petchora. There are seven passes over these mountains: the five that are the most easy to cross are—the road from Perm to Ekatarinburg; that to Petropauloskaja, and the three roads to Orenburg.

The Ural Mountains is one of the richest mineral regions in the world. The most important products are—iron, copper, gold, silver, platinum, and salt. In the article on RUSSIA will be found a statement of the values and quantities of the precious metals obtained in the year 1847. A variety of other mineral productions are also found, among which are—topaz, iridium, malachite, the onyx, topaz-emerald, beryl, and agate. Diamonds have been found of small size, but of very pure water.

URAMIL is a complex substance, formed of C^8 H^5 O^6 N^3. It is in the form of plumose acicular crystals, which are permanent in the air, and become of a pink colour when heated; they are insoluble in cold and but slightly soluble in boiling water. The alkalies ammonia, potash, and soda dissolve uramil, and acids precipitate it from them unchanged.

URAMILIC ACID (C^{16} H^{10} O^1 N^5) has the form of four-sided prisms, which are transparent and of a glassy lustre; it also appears in the state of fine silky needles. Its acid properties are feeble.

URA'NIA, a genus of plants belonging to the natural order *Musaceæ*. This genus has but one species, the *Urania speciosa*, which is a native of Madagascar. The seeds of this plant are said to constitute a wholesome food. In its cultivation in this country it requires a strong heat and an abundant supply of moisture. It must be propagated by seeds, which will grow freely in a loamy soil, if planted when they are recently imported. It may be numbered amongst the most splendid of our hothouse plants.

URA'NIUM, a metal discovered by Klaproth, in 1789, who named it after the planet Uranus, the discovery of which had previously occurred in the same year. The mineral from which it was first obtained is called *Pechblende*, or *Pitchblende*. It is a white lustrous metal. At a moderate degree of heat, in contact with the air, it burns with a white and shining light. The combustion occurs at so low a temperature, that it may take place on paper without causing it to burn. If small particles be shaken from the filter on which the metal in powder has been collected, portions so minute as to be scarcely visible burn with brilliant sparks on coming near the flame of a candle. When heated in a capsule, uranium burns brilliantly, and is converted into a deep green-coloured oxide, the bulk of which is considerably greater than that of the metal employed.

Uranium does not appear to suffer any alteration by exposure to the air, nor does it decompose water at common temperatures, but when put into diluted acids it dissolves in them with the evolution of hydrogen gas.

The minerals which contain uranium, and from many of which it may be obtained, are numerous. They comprise *Pitchblende* (oxide), *Uranite* (calcareo-phosphate), *Chalcolite* (cupreo-phosphate), *Uran Bloom* (carbonate), *Johannite* (sulphate), *Oxygen* and *Uranium* unite in several proportions. The *suboxide* (U^4 O^1) is a brown pre-

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cipitate, which speedily becomes green. The *protoxide* ($U^1 O^1$) is extremely pyrophoric, the access of air causing it to burn with feeble incandescence and converting it into black peroxide: it is of a cinnamon-brown colour, but presents a different colour when prepared in different ways. The *deutoxide* ($U^4 O^5$) is a calcined product, indecomposable by heat. The *tritoxide* ($U^3 O^4$) has an olive colour and a velvety appearance. The *peroxide* ($U^2 O^3$), although the most useful of all, has not been obtained in a single or uncombined state.

Chlorine and *Uranium* unite to form a *chloride* (U^1 Chl.^{1}), a greenish, crystalline, volatile substance; and a *subchloride* (U^4 Chl.^{3}), a deep brown powder. *Sulphur* and *Uranium* unite to form a black *sulphuret.*

Uranium, in the state of oxide, forms salts with sulphuric, oxalic, nitric, and other acids.

Protoxide of uranium is employed in colouring glass, to which it imparts a fine lemon yellow.

U'RANUS, the name which is now universally given to the planet discovered by William Herschel, while engaged in the telescopic comparison of a large number of stars. On March 13, 1781, about 11 o'clock in the evening, while engaged in examining some small stars in Gemini, he saw one which appeared to have a more sensible amount of diameter than the others, and this was found to be a planet. The six satellites were discovered between 1787 and 1797, also by Herschel.

The name given by Herschel to his new planet was Georgium Sidus, in honour of the reigning king, George III. But this name gave no satisfaction to astronomers. Laplace and others contended that the name of the discoverer should be borne by the planet; and many were found to adopt this suggestion. But the general feeling was that neither the King of England nor his astronomer was altogether in his right place, as coming after Mars, Jupiter, and Saturn; and after Neptune, Astrea, and Cybele had been severally suggested without success, Uranus (at the proposal of Bode) was adopted. The last name was appropriate, inasmuch as Uranus is the father of Saturn in mythology, as Saturn is of Jupiter, and Jupiter of Mars: but what will be done if a new planet should be discovered still more distant than Uranus?

This was the question asked in the 'Penny Cyclopædia;' and the answer, since Neptune has been discovered, is, that the sequence has been broken by absolute necessity. With reference to the nomenclature of planets, it is to be remarked that one royal name has recently found its way into the heavens by the universal consent of astronomers. The new planet discovered by Mr. Hind, in the summer of 1850, has been called *Victoria:* nor is the rule broken, for this was the classical name of a goddess before it was that of a queen.

The planet Uranus looks like a star of the sixth magnitude, and requires a considerable magnifying power and favourable circumstances to be observed. As soon as it was known to be a planet, a reference to old catalogues showed that it had been seen and noted as a star five times by Flamsteed, once by Bradley, once by Mayer, and twelve times by Lemonnier, the last of whom (says M. Arago) must have been the discoverer of the planet, if he had only arranged his observations so as to look at all those of the same star at once.

The orbits of all the six satellites differ in two material particulars from those of every other body in the solar system. They are nearly at right angles to the plane of the ecliptic (78° 58′) and their motions are retrograde, or from east to west.

Uranus is nineteen times the distance of the earth from the sun; and it revolves in 30,678 common days.

URA'RIA, a genus of plants of the natural family of *Leguminosæ*. The species are chiefly natives of India. *U. picta* is found both in that country and on the coast of Guinea, and *U. lagopoides* both in India and China.

URBAN I.—VIII. [Pope.]

URBINO. [Pesaro-e-Urbino].

URBI'NO, the birth-place of Rafaelle, a town of the papal province of Pesaro-e-Urbino, is situated on the slope and at the foot of a hill, which forms part of the watershed between the Foglio and the Metauro, and about 20 miles from the Adriatic. It is a walled town, and has several fine buildings; among others the government-house, which contains a collection of ancient inscriptions and sculptures, the palace Albani, the cathedral, and several other churches and convents. Urbino gives title to an archbishop: it has a college, an academy of sciences and literature, and about 8000 inhabitants.

U'RCEOLA, a genus of plants of the natural family of *Apocynaceæ*. It is confined to the Malayan Peninsula, and the islands of Sumatra and Penang. From wounds made in the bark of this plant there oozes out a milky fluid, which on exposure to the atmosphere separates into an elastic coagulum, and watery liquid apparently of no use. After the separation takes place, this coagulum is not only like American caoutchouc, or India-Rubber, but possesses the same properties. Dr. Roxburgh states that a ball of it had the appearance of American caoutchouc. When cut into it was of a light-brown colour, till the action of the air darkened it. This ball, measuring $9\frac{1}{2}$ inches in circumference, and weighing $7\frac{1}{4}$ ounces, in simply falling from a height of 15 feet, rebounded about 10 or 12 times, which is of itself an indication of the goodness of the caoutchouc.

URCEOLA'RIA, a genus of Lichens, belonging to the family *Lecanoreæ*. Hooker in his 'British Flora,' enumerates six British species of *Urceolaria*. They are generally found on rocks, stones, and walls. Two of the species, *U. scruposa* and *U. cinerea*, are used for dyeing.

URCHIN. [Echinidæ.]

U'REA is a principle proper to the urine of man and quadrupeds, and perhaps of all animals. It was first detected by Rouelle, and afterwards more fully examined by Fourcroy, Vauquelin, and Prout. In its solid and pure state, Urea crystallises in the form of long prismatic needles, which are white and transparent, having somewhat the

lustre of mother-of-pearl, with a taste approaching that of nitre, and none at all of the fluid which furnishes it. It is neither sensibly acid nor alkaline. The specific gravity of the crystals is 1.35. It fuses at 250° into a colourless fluid, and at a higher temperature is converted into ammonia, cyanite of ammonia, and dry solid cyanuric acid. It is soluble in its own weight of cold water, and still more soluble in hot water. Alcohol of specific gravity 0.816 dissolves one-fifth of its weight of urea at 60° Fahr. It is very sparingly soluble in æther and turpentine. The caustic alkalies decompose urea, and with the assistance of heat convert it into carbonate of ammonia. The nitric and oxalic acids combine with urea, forming salts more or less insoluble.

URE'DO, a genus of Cryptogamic plants belonging to the natural order of *Fungi*, and to the division *Hypodermii* of Fries. Included in this division are also the genera *Æcidium*, *Puccinia*, *Podisoma*, and *Gymnosporangium*.

All the *Hypodermii* are known by having their sporidia, or spore-cases, free or stipitate, and situated beneath the cuticle of living plants. On examining any one of the productions thus constituted, it will be found that the part of the plant on which they are placed has lost its natural colour and other characters. The cuticle, under which they grow, is discoloured, frequently raised, and bursts in the process of time.

The species of the genera of *Puccinia*, *Æcidium*, and *Uredo* are exceedingly numerous. In fact they seem to vary with every plant they attack, and have thus given rise to specific names according to the plants on which they are found, as *Puccinia Primulæ*, *Æcidium Berberidis*, *Uredo Violarum*, &c.

Uredo, rubigo, and *linearis* form yellow and brown oval spots, and blotches of an orange and yellow colour upon the stem, leaf, and chaff of corn, and various grasses. The sporidia of *U. linearis* are more oblong than those of *U. rubigo*, but they are frequently found together. When these plants are present the disease of the corn is called Rust, Red-Rag, Red-Robin, and Red-Gum. This is the plant which Henslow believes to be identical with the *Puccinia graminis*, which occurs in corn affected with mildew.

URE'NA, a genus of plants of the natural order *Malvaceæ*. The species form small shrubs, which are indigenous in India and the Indian islands, China, Mauritius, South America, and the West Indies. *U. scabriuscula* is said to be found both in India and Brazil. The flowers of all are red. Few of the species are sufficiently ornamental to be worth cultivation except *U. speciosa*.

URETHRA. [Bladder.]

URFE', HONORE' D', author of the pastoral romance 'L'Astrée,' was born at Marseille, Feb. 11, 1567. He was the younger son of a noble family. His life was in accordance with the tinsel sentiment of his romance. After serving for some time in the wars of Henry IV., he married Diane de Château Morand, after she had been divorced from his elder brother, with no higher object than to keep her estates in the family; but disagreeing with her on a question of taste arising out of the lady's partiality for dogs, he retired into the country and amused his loneliness with the composition of 'L'Astrée,' the first part of which was published in 1610, and received so favourably, that a second part appeared in 1612, and two more in 1618. For upwards of half a century 'L'Astrée' enjoyed an unmeasured popularity. D'Urfé, who also published some less popular works, died in 1625.

URGEL. [Cataluña.]

URI, one of the Swiss cantons, is bounded N. by Schwyz, W. by Unterwalden, Bern, and the Valais, S. by the group of the St.-Gothard, which separates it from the canton of Ticino, and E. by the Grisons and Glarus. It consists chiefly of a valley about 30 miles long, and drained by the Reuss, which rises in Mount St.-Gothard, and flows northwards into the Waldstätter Lake. The southern branch of this lake is called the Lake of Uri. Several minor valleys branch out right and left from the valley of the Reuss. The surface of the canton is mostly covered with ridges of the Pennine Alps, several of which exceed 10,000 feet in height. There is a tract of open country in the lower part of the valley of the Reuss, near the shore of the Waldstätter Lake. Uri is essentially a pastoral country: horned cattle, sheep, and goats are numerous. The population of the canton, by the census of March, 1850, was 14,505, all Catholics but 12; the area is 422 square miles. The chief town is Altorf. [Switzerland.]

URIC ACID. This substance, sometimes called *Lithic Acid*, was discovered by Scheele; Vauquelin afterwards found it in the excrements of serpents, Brugnatelli in that of silkworms, and Robiquet in cantharides.

Uric acid is secreted by carnivorous animals, birds, and by several insects. It is deposited from human urine, as it cools, as a yellow or brownish-yellow powder, which is usually a compound of uric acid and ammonia. It occurs, in combination with soda of ammonia, in those gouty concretions commonly called Chalk Stones, and it constitutes the principal portion of the calculi deposited in the human bladder. The semi-fluid urine of serpents and birds is chiefly composed of urate of ammonia; and Guano, which has been imported from some islands in the South Sea, and extensively used as a manure, contains a large quantity of urate of ammonia: this substance is the decomposed excrement of aquatic birds.

URINE is a fluid secreted from the blood by the kidneys. Every excretory organ performs some special office: the lungs clear the system of its excess of carbon; and the kidneys purify it of azote and saline matter. Besides secreting a peculiar azotic substance, the kidneys have an oxygenating power, for the sulphur, phosphorus, calcium, &c., of the blood are changed to acids and oxides, or earths, by the glandular energy of these organs.

The urine of a healthy person when recently voided is acid, transparent, usually of a pale amber or straw-colour, a brackish taste, peculiar odour, and of a specific gravity varying from 1.010 to 1.030.

The character of the urine is affected by the seasons. In winter the kidneys are excited to greater activity than in summer. In cold weather the perspiration is more or less suppressed; and were it not that the action of the kidneys is increased, we should be liable to plethoras, or repletions of the most dangerous nature. Hence it happens that when the perspiration is abundant, the urine is scanty and high-coloured, and contains a strong impregnation of saline ingredients. When the perspiration is checked by any cause, the urine is copious, limpid, and its proper salts more diluted.

Healthy urine is always acid; it becomes ammoniacal only by a prolonged exposure to the atmosphere, for it remains perfectly unchanged if kept in a vessel well stopped.

In health the quantity passed in twenty-four hours is subject to variation from the temperature, diet, and exercise of the individual, as well as other circumstances, and it is therefore impossible to fix a standard applicable to every case. If we consider that the quantity varies in this country from 30 ounces in the summer to 40 ounces in the winter, we should probably be very near the truth as regards a person in good health, and who does not drink more than nature requires.

Berzelius, whose analysis of urine is still considered the most complete, describes the following substances as entering into its composition, viz.—in 1000 parts of healthy urine:—

Water	933.00
Urea	30.10
Lithic acid	1.00
Free lactic acid, lactate of ammonia, and animal matters not separable from them	17.14
Mucus of the bladder	0.32
Sulphate of potash	3.71
Sulphate of soda	3.16
Phosphate of soda	2.94
Phosphate of ammonia	1.65
Muriate of soda	4.45
Muriate of ammonia	1.50
Earthy phosphates, with a trace of fluate of lime	1.00
Silex	0.03
	1000.00

In addition to these matters, which constantly exist in healthy urine, the fluid occasionally contains a variety of other substances, as sugar, bile, albumen, fibrin, fat, blood, &c.

Most of the substances found in healthy urine may exist in excess when they indicate diseased states of the system. Sometimes these substances are deposited in the bladder, forming concretions. [CALCULI.] When those substances are found in the urine which do not exist there naturally, they always indicate disease.

URSA MAJOR and URSA MINOR (the Greater Bear and Lesser Bear), two of the most remarkable constellations of the northern hemisphere: the latter as containing the pole star, or the visible star which is nearest to the northern pole of the heavens; the former from its well-known seven stars, by two of which the pole star is always readily found.

The common people of most countries call the seven stars of the Great Bear by the name of 'the waggon,' sometimes by that of 'the plough.' Arátus most distinctly says that both the bears were called waggons by the Greeks; and 'Charles's Wain' is familiar to all our readers.

URSIDÆ, a group or family of carnivorous quadrupeds, of which the bears are the typical representatives. [BEAR.] The gluttons belong to the *Mustelidæ*, and not to the *Ursidæ*. [GULO; WEASELS.]

Most authors assign to this family the Raccoons (*Procyon*, Storr), and the Ratels (*Mellivora*), but the latter decidedly belong to the *Mustelidæ*. On these animals however we may here make a few observations.

The Raccoon (*Procyon Lotor*, Storr; *Ursus Lotor*, Linn.), is the *Raton* of the French; *Raccoon* ('*Coon* in clipped language) of the Anglo-Americans; and *Raccoon Bear* of Pennant.

Geographical Distribution. — 'This animal,' says Dr. Richardson, 'inhabits the southern parts of the fur districts, being found as far north as Red River, in lat. 50°, from which quarter about 100 skins are procured annually by the Hudson's Bay Company. If there is no mistake as to the identity of the species, the Raccoon extends farther north on the shores of the Pacific than it does on the eastern side of the Rocky Mountains. Dixon and Portlock obtained cloaks of Raccoon skins from the natives of Cook's River, in lat. 60°, and skins supposed to be of the Raccoon were also seen at Nootka Sound by Captain Cook. Lewis and Clarke expressly state that the Raccoon at the mouth of the Columbia is the same with the animal in the United States. Desmarest says that the Raccoon extends as far south as Paraguay.'

Habits, &c.—The negroes of Georgia, near Savannah, declare, at the present day, that at low tide the Raccoons go down to the shore, open and eat oysters, and that occasionally when they put their paw in to take out a large-sized oyster (those mollusks are often of great size in that locality), the oyster closes his shell, and holds the Raccoon in this living trap till the flowing tide drowns the four-footed burglar, unless the 'coon manages to bite off his paw and escape in time. For a full history of this animal we refer to Lawson's 'History,' 1714; Pennant; Catesby; Richardson ('Fauna Boreali-Americana'); Bennett ('Tower Menagerie').

As an example of the Ratels, we may adduce the *Mellivora Capensis*. This is the *Viverra Capensis* of Schreber, *Gulo Capensis* of Desmarest, *Mellivora Capensis* of F. Cuvier, *Viverra mellivora* and *Ursus mellivorus* of Blumenbach, *Ratel* of Sparrmann, *Fizzler Weesel* and *Ratel* of Pennant, *Honey Weesel* of Shaw, *Honig Freter* of the Dutch Cape colonists, and *Blaireau Puant* of La Caille.

Mr. Bennett observes that this animal was first clearly described by La Caille in his 'Voyage to the Cape,' under the misapplied designation given above as the last synonym. This unmerited

epithet, he remarks, has, in all probability, given rise to the general opinion that it is also the animal referred to by Kolbe as the *Stinkbinksen* of the Dutch colonists; but there is scarcely any part of his account of that disgusting creature which fairly warrants the inference. It is far more likely, Mr. Bennett thinks, that his beast was the *Zorille*, to which alone, of all the animals of Southern Africa, its manners bear a close resemblance. Sparrmann described it with tolerable accuracy, under its Hottentot and Colonial designation, which it still retains. Gmelin and Shaw have subdivided these synonyms and formed two species, *Viverra Capensis* and *Viverra mellivora*. Pennant, who gives the designations of La Caille, Sparrmann, and Kolbe, under his title *Ratel*, saw John Hunter's living Indian specimen, treated it as distinct from the African animal, and called it the *Indian Badger*, out of which Shaw made his *Ursus Indicus*.

Geographical Distribution.—South Africa.

Habits, &c.—The hide of this quadruped is so tough and loose, that, according to Sparrmann, if anybody catches hold of it by the back part of the neck, it is able to turn round, so to speak, in its skin, and bite the offending arm. The claws of the fore-feet are longest, and well formed for grubbing. The bees, according to the description of the author last quoted, who drew his information from the Hottentots, furnish the principal means of subsistence to the Ratel. These insects in that part of South Africa where the Ratel is found, usually inhabit the deserted lairs and burrows of the Ethiopian Boar, the Porcupine, &c., and, according to the accounts given, the Ratel, which preys in the evening, ascends to the highest parts of the desert to look out, and will then raise its paw before its eyes to prevent their being dazzled by the sun. Here he watches and listens for the Honey-Guide Cuckoo [INDICATORINÆ], which serves both the Hottentot and quadruped as a conductor to the bees' store, or for the flight of the bees themselves. If the beast have luck to trace the guide or the insect it follows, and if the nest be on the ground or near it, it undermines the nest with its natural digging instruments, and secures the contents. If the nest be in a tree, the Ratel, which cannot climb, gnaws the trunk in its unavailing rage, leaving marks which the Hottentot well knows as indicative of the treasure above.

The Indian Ratel is a distinct species, but agrees with the African in general habits and manners.

URSI'NUS, FU'LVIUS, one of the most eminent Italian scholars of the 16th century, was born on the 2nd of December, 1529, at Rome. He was the natural son of a commander of the order of Malta, who belonged to the noble family of the Orsini. In consequence of a dispute between his mother and his father, she and her child were cast upon the world, and she was obliged to beg. Some early indications of talent which the boy evinced procured him a place as 'clericus' in the church of St. John in the Lateran. Here he gained the attachment of the canon, Gentilio Delfini, who instructed him in the Latin and Greek languages. Ursinus became a priest, and thus secured a comfortable living and leisure for literary pursuits. Gregory XIII. gave him a pension of 200 ducats. He was thus enabled to buy books and MSS., and to form an archæological Museum; and also to support his mother. He died in May, 1600. He was a learned man and a man of sense. His numerous works consist of commentaries on ancient writers, editions of ancient writers, and treatises on archæological subjects. Of his original works his 'Familiæ Romanæ,' &c., of which C. Patin published an improved and enlarged edition in 1663, is useful.

URSULINES, an order of nuns in the Roman Catholic church, founded about 1537, by Angela Merici, commonly called Angela da Brescia, who was born in 1511, at Desenzano, on the Lago di Garda, and died at Brescia March 21, 1540. The institution was confirmed by Pope Paul III., in 1544, and it was upon this occasion that the name of Ursulines was given to the order, after the British Saint Ursula. The first house of Ursuline nuns was founded at Paris, in 1604, by Madam de Sainte Beuve. For further information respecting the Ursulines, both of France and other Roman Catholic countries, the reader may consult Helyot's 'Histoire des Ordres Monastiques.'

URSUS. [BEAR; URSIDÆ.]

URTICA, a genus of plants known under the common name of Nettle. Nettle is the same word as the Anglo-Saxon *netel*, or *nædl*, a needle, which is applied to these plants on account of their possessing small bristles or prickles which have a stinging property. This genus is the type of the natural order *Urticaceæ*. Most of the species are herbaceous plants or under-shrubs, and are found in Europe, Asia, and America. Three of the species, of which there are about 40, are British.

Urtica piluifera, the Roman Nettle, is found in England, under walls and amongst rubbish, principally near the sea, in the counties of Norfolk and Suffolk. It has also been found in the south of Ireland. This is the most virulent of our native nettles. Its stinging properties depend upon the possession of a form of hair, which has at its base a bag of poisonous secretion, which is forced into the hair when pressed, and produces the stinging effects which are common to several species of the genus. *U. dioica*, the Great Nettle, is a very common plant throughout Europe, in waste places, under walls and hedge-banks. The tops of this plant, when young in spring, are sometimes eaten as a potherb. *U. urens*, Small Nettle, possesses the stinging properties of the last two. It is common in cultivated ground, especially gardens throughout Europe.

Though nettles are so common in Europe, the finest species are found in tropical countries. They extend from the Malayan Peninsula all along the Himalaya Mountains; and some of them, from the beauty of their foliage, might even be ranked among ornamental plants. Some of the Indian species do not sting, but others possess this property in a very extraordinary degree: for instance *U. heterophylla*, which is a most ferocious-looking plant, and may be seen in the Calcutta Botanic

Garden always surrounded with a fence, as the least touch of any part produces most acute pain. The most important species of this genus is *U. tenacissima*, which, like some of the other nettles, as well as the hop and the hemp, belonging to the same natural family, abounds in ligneous fibre, which may be converted into strong cordage.

URTICA'CEÆ, a natural order of plants, placed by Lindley in his Rectembryose group of incomplete Dicotyledons. The plants belonging to this order are trees, shrubs, and herbs, yielding in some instances a milky juice. They are very generally dispersed over the world. Some of them grow in the most northern regions of the globe, whilst others are found in the tropics; some of them will grow amongst rubbish and dry walls where hardly a speck of other vegetation occurs, whilst others only inhabit the damp recesses of gloomy forests. The species are very numerous, many of them being mere weeds, whilst others are large trees yielding useful and delicious fruits. This order brings together plants possessing very different properties, and yielding very various and useful products. The stinging nettles [URTICA] form the type of the order. To it belongs also the Deadly Upas. [ANTIARIS.] The wholesome fig, the celebrated banyan, and species yielding deadly poisons, belong to the genus *Ficus*. The bitter hop, the acid mulberry, and the narcotic hemp are also found here. The famous cow-tree, or Palo de Vacca of South America, which yields a copious supply of rich and wholesome milk, is supposed to belong to this order. The sap of many of the species, especially those belonging to the division *Artocarpeæ*, is milky. This depends on the presence of caoutchouc, which in many instances is procured from the plants of this order. The *Cecropia peltata*, a tree found in Jamaica, is said to yield the caoutchouc called American. It has hollow stems and branches, which are used for the purpose of forming wind instruments. The wood is light, and it is often used for making fishing-floats, and the bark is manufactured into cordage. The ligneous part is very dry and will catch fire by attrition; and of this the native Indians take advantage for producing fire by rubbing the *Cecropia* against some harder wood. The spontaneous combustion of forests is in some instances attributed to the attrition of branches of this tree during a high wind. The fruits are crowded together like the acini of the common raspberry, and are not unlike that fruit in flavour. They are a favourite food of pigeons and other birds. The seeds, or nuts, of a plant nearly allied to *Cecropia*, called Musanga by the Africans of the gold coast, are eatable. The Osage Orange, *Maclura aurantiaca*, belongs to this order.

URUGUAY, or *Banda Oriental*, an independent Republic in South America, is bounded S. by the Rio de la Plata, N. by the Brazilian province of Rio Grande do Sul, E. by the Atlantic Ocean, and W. by the river Uruguay. It extends from 29° 30′ to 35° S. lat., and from 53° to 58° W. long. The area is about 70,000 square miles. The population is estimated at about 200,000.

By far the greatest part of the country is hilly and elevated. It forms as it were the most southern prolongation of the Serra do Mar (the sea mountain-range of Brazil), which extends northward to near the mouth of the Rio de St. Francisco (9° S. lat.). The range rises rather abruptly from the shore of the Rio de la Plata, but at no great distance inland it takes the shape of an extensive table-land, the surface of which in many places presents hardly any perceptible irregularity, and in others is covered with extensive ranges of low hills. Both the plains and the hills are without trees, and afford only pasture for cattle. The hills are called Cochilhas, and the highest range, which forms the water-shed between the ocean and the river Uruguay, is named the Grand Cochilha. On the west the table-land seems to extend to the banks of the river Uruguay, but here it is cut by numerous valleys, and presents the aspect of an extremely hilly country.

That portion of Uruguay which extends along the coast to the north of Cape Santa Maria, and about 60 or 80 miles inland, is low, and is a part of a very remarkable tract which occupies the eastern coast of South America from 28° to 34° S. lat., or from the island of Santa Catharina to Cape Santa Maria. Nearly through its whole extent it is covered with sand, and intersected by innumerable lakes of different sizes. The greatest part of this low plain belongs to the Brazilian province of Rio Grande do Sul. It is of very indifferent fertility.

This country, being situated without the tropics, enjoys a temperate climate, resembling that of Spain or Italy. The air is pure and healthy. The winter lasts from May to October. Frost is occasionally felt in July and August. The high table-land is annually exposed to it, sometimes for one or two months together; but as very little snow falls, the cattle find pasture in these districts all the year round.

The principal river is the Uruguay, which originates in that portion of the Serra do Mar which stretches along the ocean opposite the island of Santa Catharina, and runs W. for a considerable distance under the name of Pellotas. It takes the name of Uruguay not far from the point where it begins to separate the province of Rio Grande do Sul from the republic of Corrientes. Here it assumes the appearance of a large river, and soon begins to bend its course to the S.W. In lat. 29½° it receives the Ibecuy, and then begins to flow S., forming the boundary between Uruguay and the republics of Corrientes and Entre Rios. Not far from the place where it enters the great æstuary called the Rio de la Plata, its waters are increased by those of the Rio Negro, which joins it on the left bank. The Uruguay is navigable for large boats to the first great fall, called Salto Grande, situated nearly at an equal distance from the mouths of the Ibecuy and Rio Negro. About 40 miles below the former there is the Salto Chico, or Little Fall, which again interrupts the navigation of the smaller boats or canoes. The whole course of this river is about 1000 miles.

The Ibecuy rises in the Grand Cochilha, and

first runs W., but soon turns N., and flows in that direction upwards of 60 miles, after which, having joined the Ibecuy Mirim (Little Ibecuy), it again turns to the W., and becomes a considerable river, separating part of Uruguay from the province of Rio Grande do Sul. Its current is almost always tranquil, and the stream is navigable nearly to its head. The whole course of the Ibecuy is about 250 miles.

The Rio Negro has its origin near that of the Ibecuy, and its general direction is to the S.W. It joins the Uruguay about 12 miles before that river enters the Rio de la Plata, after having run upwards of 250 miles.

Two considerable lakes, lying in the eastern plain, belong in part to Uruguay. The largest is the Lake Mirim, which signifies the Small Lake, having received this name from comparison with the Lake Los Pos, which is not far distant to the N., but belongs to the province of Rio Grande do Sul. The Lake Mirim is 90 miles in length and 25 at its greatest width. It lies parallel to the shores of the ocean, and discharges its waters into the lake of Los Patos by a channel 50 miles long, wide and navigable. About the southern half of this lake belongs to Uruguay. The other large lake, the Mangueira, extends between the coast and Lake Mirim. It is 80 miles long and about 4 broad, and empties itself into the ocean at its northern extremity by a short channel. The greatest part of this lake belongs to Uruguay.

At San Carlos, to the west of Cape Santa Maria, a rich copper-mine is worked.

The valleys on the west and south are well adapted to a great diversity of production. Wheat, rye, barley, Indian corn, rice, peas, beans, watermelons, and other kinds of melons, with onions, are cultivated; also some cotton, mandioca, and the sugar-cane. Hemp and different qualities of flax grow in great abundance. Timber is by no means abundant.

More than four-fifths of the country being only fit for pasture, cattle of course constitute the chief wealth. Some cattle are consumed in the country, and others sent to the slaughter-houses of Monte Video, whence hides are exported in large numbers. By far the greatest proportion of the flesh is converted into jerked beef, which is salted without the bones, dried in the sun, and exported to different parts of America, especially Brazil. Every great proprietor breeds also a certain number of horses and mules, and some of them a great number of sheep, which have a fine wool.

When the Europeans first arrived, several native nations were in possession of this country, some of whom are still found in the interior, but in small numbers. By far the greatest number of the inhabitants are the descendants of Europeans.

The metropolis of the republic is described under the head of Montevideo. Between it and Cape Santa Maria stands the town of Maldonado, with a fine harbour, good fortifications, and about 2000 inhabitants: it exports hides and copper. Colonia del Santo Sacramento is a small town, with a harbour, opposite Buenos Ayres.

The constitution of the Republica del Uruguay Oriental was published in the month of August, 1830; according to which the legislative power is divided between a senate and a house of representatives.

URUS. [Bison.]

URVILLE, J. DUMONT D', a French navigator and naturalist. One of his earliest contributions to botany was a memoir on the plants which he had collected in the Grecian islands, published at Paris in 1822. In 1826 he was appointed by the King of France to the command of the frigate Astrolabe, for the purpose of making a voyage in search of information with regard to the unfortunate La Perouse and his companions. The vessel left Toulon in March, 1826, and continued out till 1829. A full account of this memorable voyage, during which he found undoubted evidence of the destruction of the expedition, and made many important discoveries, was published in 1830 and successive years by D'Urville, under the title of 'Voyage de la Corvette l'Astrolabe, exécuté par ordre du Roi pendant les années 1826, 1827, 1828, 1829,' Paris, 8vo., plates folio.

Im 1837 D'Urville had placed under his command the frigates Astrolabe and Zélé, for the purpose of making a voyage to the South Pole. In a first attempt he reached the latitude 64°, and explored to some extent what he thought to be a new coast; he was obliged however to retire on account of the icebergs. Having remained for some time at Conception, he made a second attempt, and discovered a coast at 66° 33′ S. lat. and 138° 21′ E. long. On his return to Paris he published an account of this expedition with the official reports of the minister of marine, Paris, 1839.

D'Urville met with his death May 8, 1842, by the unfortunate railway accident that occurred between Versailles and Meudon, by which himself, his wife and son, and nearly fifty passengers, were killed.

USAGES. [Customs.]

USBEKHISTAN. [Bokhara.]

USE. A use, at common law, was a beneficial interest in land, distinct from the legal property therein. The origin of uses is derived by Gilbert ('Law of Uses,' 3) from a title under the civil law, which allows a usufructuary interest, distinct from the ownership of the thing itself. He says it was introduced by the clergy, who were masters of the civil law, and who, 'when they were prohibited from taking anything in mortmain, after several evasions by purchasing lands of their own tenants, suffering recoveries, purchasing lands round the church and making them churchyards by bull from the pope, at last invented this way of conveying lands to others to their own use; and this being properly matter of equity, it met with a very favourable construction from the judge of the Chancery court, who was in those days commonly a clergyman. Thus this way of settlement began; but it more generally prevailed among all ranks and conditions of men by reason of the civil commotions between the houses of York and Lancaster, to secrete the possessions, and to preserve them to their issue, notwithstanding attainders; and hence began the

limitation of uses with power of revocation.' But whatever may have been the origin of uses, it is certain that the desire of effecting secret transfers of property without resorting to the modes of conveyance of the common law, as well as the desire to dispose of landed property by will or devise, which the common law did not allow, led to an early adoption of the system.

The person who was entitled to the use was called the *cestui que use*. He had no means of maintaining his title to the use except by the writ of subpœna, whereby the person who had the legal estate in the land, the feoffee to uses, was bound to appear in Chancery, and was compelled to answer upon oath as to the confidence reposed in him.

A use was descendible, according to the rules of the common law respecting estates of inheritance. It was also alienable by deed, and devisable before the statute of wills, the courts of equity having favoured this method of evading the strictness of the common law, which allowed no transfer of land without livery of seisin. But the *cestui que use* had no legal ownership. The feoffee was still complete owner of the land at law. He performed the feudal duties, his wife had dower, and his estate was subject to wardship, relief, &c. He might sell the lands, and forfeit them for treason or felony.

The system of uses having been found to produce many inconveniences, notwithstanding various statutes which had been passed from time to time to modify them, it was thought a remedy would be found by joining the possession to the use, or, as it is usually termed, transferring uses into possession. With this view the statute of 27 Hen. VIII., c. 10, commonly called the Statute of Uses, was passed. The provisions of this statute can only be fully explained in a treatise on the system of uses. On the Statute of Uses has been founded the system of conveying and making settlements of property in land which is now in use in England.

The subject of uses is treated in Sanders, 'On Uses and Trusts;' and in Gilbert, 'On Uses,' by Sugden.

USES, CHARITABLE AND SUPERSTITIOUS. The term 'Charitable Use' has a very extensive legal meaning, and includes dispositions of property which are not in ordinary language described as charitable, but which are so called with reference to the purposes enumerated in the statute 43 Eliz., c. 4, or such as are considered analogous to them. That statute enacted that the Commissioners thereby empowered should inquire as to the lands, &c., given by well-disposed people 'for relief of aged, impotent, and poor people; for maintenance of sick and maimed soldiers and mariners; schools of learning, free-schools, and scholars in universities; for repair of bridges, ports, havens, causeways, churches, sea-banks, and highways; for education and preferment of orphans; for or towards the relief, stock, or maintenance of houses of correction; for marriage of poor maids; for supportation, aid, and help of young tradesmen, handicraftsmen, and persons decayed; and for relief or redemption of prisoners and captives, and for aid or ease of any poor inhabitants concerning payment of fifteens, setting out of soldiers, and other taxes.' The term Charitable Use is applicable only to gifts for what are called public charities, the objects of which are not particular individuals, but a class or the public in general.

If lands, tenements, rents, goods, or chattels, were given, secured, or appointed for or towards any of the following purposes: for the maintenance of a priest or other man to pray for the soul of any dead man in such a church or elsewhere; to have or maintain perpetual obits, lamps, torches, &c., to be used at certain times to help to save the souls of men out of purgatory,—these or the like purposes are declared to be Superstitious Uses by 1st Edward VI., c. 14. It is now an established rule of law that gifts for superstitious uses generally are void, and many gifts have by the courts been declared to be for superstitious uses which are not such in the ordinary acceptation of the term. A change in the doctrine of superstitious uses has been made by the 2 & 3 Wm. IV., c. 115, which puts persons professing the Roman Catholic religion upon the same footing, with respect to their schools, places for religious worship, education, and charitable purposes, as Protestant Dissenters; with respect to whom the doctrine of the court is, that it will administer a fund to maintain a society of Protestant Dissenters promoting no doctrine contrary to law, though at variance with that of the Established Church. The 2 & 3 Wm. IV., c. 115, is retrospective. (2 M. and K., 225.) Though it is now lawful to give money by will for Roman Catholic schools or for promoting the Roman Catholic religion, it is not lawful to give money for prayers and masses for the soul of a testator.

The Court of Chancery has a general jurisdiction over property given for charitable purposes, and the regular mode in which matters relating to charities are brought before it is by information by the attorney-general on behalf of the crown.

USHER (in Latin *Usserius*), JAMES, was born at Dublin, 4th January, 1580. His father was Arnold Usher, one of the six clerks of the Irish court of chancery. He was well taught in a school at Dublin; and in 1593 he went to the newly-opened university of Trinity College, Dublin, of which he was one of the first three students that were admitted.

He had already acquired a high academic reputation, when in 1598 the death of his father, who had intended to educate him for the law, left him at liberty to follow his own inclinations, which led him to the study of theology. He took his degree of M.A. in 1600, and in the following year was ordained deacon and priest by his uncle, the archbishop of Armagh.

In 1603 and 1606 he visited England, and became acquainted with Sir Thomas Bodley, Sir Robert Cotton, Camden, and other distinguished persons; and subsequently he occasionally made a journey to England. In 1607 he was chosen professor of the faculty of divinity, in his college, and he held the office for 13 years. In 1620 King James made

him bishop of Meath, and in January 1624, while he was in England, he was raised to the archbishopric of Armagh and the primacy of the Irish Church.

In 1640 he visited England with the intention of staying a year or two. In 1641, his house at Armagh was attacked by the rebels, and he was plundered of nearly everything that he had. Upon this, Charles I. conferred on him the bishopric of Carlisle *in commendam;* but the revenues of the bishops were shortly afterwards confiscated by the parliament, and Usher did not receive the pension of 400*l.* a year that was allotted for his support above once or twice. Meanwhile, continuing to reside mostly at Oxford, where he preached every Sunday, he published there, in 1644, in 4to., an edition, in Greek and Latin, of the Epistles of Polycarp and Ignatius, reprinted at London in 1647. Soon after this he left Oxford, and resided with various friends. In 1647 he was chosen preacher to the society of Lincoln's Inn, upon which he took up his residence in the inn, and had his library, the only part of his property he had saved, removed thither. He preached regularly during term time in the chapel of the inn for nearly eight years. In 1650 Usher published at London, in folio, the first part of his 'Annales Veteris et Novi Testamenti,' which was followed by the second part in 1654; other editions of both parts, all in folio, appeared at Paris in 1673, at Bremen in 1675, and at Geneva (the best) in 1722. He died at Lady Peterborough's house, at Reigate in Surrey, after a day's illness, on the 21st of March, 1656; and his remains were interred in Westminster Abbey by order of Cromwell. For a notice of the numerous works of this most learned prelate, the reader may consult the references at the end of the article 'Usher,' in the 'Penny Cyclopædia.'

USK. [Monmouthshire.]

USSEL. [Corre'ze.]

USTJUG VELIKI, a considerable town in the Russian government of Vologda, situated in 60° 47′ N. lat., 46° 5′ E. long., at the confluence of the Suchona and the Jug. [Dwina.] It is an old town with about 14,000 inhabitants; the houses are for the most part of wood. The town, being situated on the direct road from Archangel to Siberia and the southern provinces, is very important in a commercial point of view.

USURY. This word comes from the Latin Usura, or as it is more frequently used, Usuræ, in the plural number. The Latin word signifies money paid for the use of money lent. The old word in use in England to signify what we now call interest, seems to have been Usury. But usury now means taking more interest for the loan of money than the law allows. A good deal on the subject of usury is contained in the arguments and judgments in the case of the Earl of Chesterfield and others *v.* Sir Abraham Jannsen (2 Vez., 125).

Interest is money which is paid for the use of other money, called Principal. The general practice is this: the borrower agrees to pay a fixed sum yearly, half-yearly, or quarterly, for each 100*l.* lent, until the money lent is returned. When this is not the case, and when the money paid for the loan depends upon the success of an undertaking, or any casualty not connected with the duration of life, it is called a *Dividend:* when the money and its interest are to be returned by yearly instalments, and paid off in a certain fixed number of years, it is called an *Annuity Certain;* but when the payment is to depend upon the life of any person or persons, it is called a *Life-Annuity.* But by whatever name the proceeds of money may be called, the rules of calculation are the same in every case except that of a life-contingency.

The laws which regulate and limit the rate of interest in this country having been made by those who were among the class of borrowers rather than that of lenders, may perhaps afford some explanation of the views of the legislature in putting restrictions on the trade in money. That these restrictions however were, and so far as they exist still are, unfavourable both to lenders and borrowers, and more unfavourable to the borrowers than the lenders, may easily be demonstrated.

A statute passed in 1545 limited the rate of interest to 10 per cent. per annum; in 1624 the rate was lowered to 8 per cent., in 1660 to 6 per cent., and by the statute 12 Anne, st. 2, c. 16 (1713), it was further reduced to 5 per cent., beyond which rate, with the exceptions which will be mentioned, it has been illegal to charge since that time.

The law does not recognise the charge of interest upon interest, or, as it as called, compound interest. This however is a rule easily evaded by the borrower granting a further acknowledgment of the interest as though it were principal: such new contract changes the interest already due into a principal sum. The law also recognises rests in mercantile and banking accounts, in which interest is charged upon a former ascertained balance. Such balance often includes interest already due; and thus the creditor really receives interest upon interest, or compound interest.

Debts do not always carry even simple interest from the time when the money becomes due to the creditor: in such case payment of interest is rather the exception than the rule. Unless the debt be such a debt as carries interest by the custom of merchants or traders, or unless there is an express agreement to such effect between the parties, or unless such agreement can be inferred from their course of dealing, or unless there are some very special circumstances, debts do not carry interest from the time when due. But now, by 3 & 4 Will. IV., c. 42, a jury may, if they think fit, upon all debts or sums certain, allow interest to the creditor, at a rate not exceeding the current rate of interest, from the time when such debts or sums were payable, if payable by virtue of a written instrument at a certain time; or if payable otherwise, then from the time of a demand of payment in writing, so as such demand give notice that interest will be claimed from the date of such demand. This statute also empowers juries to give damages, in the nature of interest, in respect of the detention or appropriation of

goods. By 1 & 2 Vict., c. 110, all judgment-debts are to carry interest at the rate of 4 per cent. per annum from the time of entering up the judgment.

The relaxation above mentioned as having been made as to the rate of interest formed part of the arrangement made in 1833, at the renewal of the charter of the Bank of England. (3 & 4 Wm. IV., c. 98.) It consisted in excepting from the operation of the statute all bills of exchange and promissory notes not having more than three months to run previous to their maturity; these might be discounted at any rate of interest agreed upon with the holder. More recently, by the act 1 Vict., c. 80 (July, 1837), this relaxation was extended to all mercantile instruments which have not 12 months to run before they are due.

UTAH, a Territory belonging to the United States of North America, recently established. Concerning this new Territory, as well as the new State of California, no precise information has yet (Jan. 1, 1851), as far as we know, reached this country. The Territory of Utah seems to be bounded N. by Oregon, S. by Mexico, from which it is divided by the river Gila, E. by the western slope of the Rocky Mountains, and W. by the eastern boundary of the State of California, whatever that boundary may be. The Utah Indians inhabit the N.E. part of the Territory, and in this part is a lake of salt-water 90 miles long, 30 to 40 miles wide, about 4000 feet above the level of the sea, and which has no known outlet. About 20 miles S. from the Great Salt Lake is Utah Lake, a much smaller lake of fresh-water, which discharges itself into the Great Salt Lake. The American population of the Utah Territory are almost entirely Mormons, a religious sect, who have laid out a city in the Salt Lake Valley, on the east side of the stream which discharges the waters of Utah Lake into the Great Salt Lake. This city is named *Deseret*, and is said to have already a population of more than 6000, while the Mormon population of the Salt Lake Valley, exclusive of the city, is said to amount to upwards of 10,000.

UTICA [Tunis.]

UTICA. [New York.]

UTRECHT, one of the Dutch provinces lying between Holland, Gelderland, and the Zuider-Zee, has an area of 534 square miles, and a population, according to the census of Nov., 1849, of 149,453. In the northern and western parts, and on the banks of the Leck, the surface is level and low; between Utrecht and Amersfoort there are some low hills. The soil in the low parts is rich and fertile; in the more elevated tracts sandy, with here and there some thickets, extensive heaths, and peat-moors. A great portion of these waste lands have been recently reclaimed. The province is drained by the Rhine and its branches, and by several canals. The air is pure and healthy, and there is good fresh-water. The natural productions are—the common domestic animals, poultry, fish, bees, wheat, tobacco, buckwheat, pulse, garden-fruit, culinary vegetables, flax, and hemp. The manufactures are chiefly in the towns, and consist of woollen, cotton, silken, and linen fabrics: there are also breweries and distilleries. The exports are—corn, cattle, swine, butter, cheese, some manufactured goods, bricks, and tiles. The roads in this province, which are remarkably smooth, are paved with clinker-bricks. All the heavy traffic is carried on by the canals or railroads to Amsterdam and Arnhem. Another line of railway now in course of construction will unite the town of Utrecht to Rotterdam.

Utrecht, the capital of the province, is situated at the point of divergence of the Oude Rhyn and the Vecht, in 52° 5′ N. lat., 5° 7′ E. long., and has 45,000 inhabitants. The Rhine divides the city into two parts, and there are likewise two canals with thirty-six drawbridges. The site is dry and rather elevated, with a descent towards the river. The approaches to the city are very beautiful, especially that from Amsterdam, which consists of a broad avenue, bordered with rows of trees. The appearance of the city itself is antique, many of the houses being in the Gothic style. It was formerly strongly fortified, but the ramparts have been converted into public walks. There is a magnificent walk called the Maliebann, above half a mile in length, planted with eight rows of lime-trees. The cathedral, with its tower 388 feet high, was destroyed by fire a short time ago. There are—a mint, 8 Calvinist churches, 1 Lutheran, 1 Anglican, 1 Moravian, 3 Roman Catholic churches, and several charitable institutions. The town-house is a handsome modern building. The university, founded in 1634, has faculties of languages, mathematics, medicine, theology, and law; attached to it are a botanic garden and an observatory. The inhabitants manufacture woollen-cloths, silk, lace, and needles; they have also sugar-refineries and bleaching-grounds.

UTRICULARIA, a genus of plants belonging to the natural order *Lentibulariæ*. There are only three species of this genus described, and they are all inhabitants of Great Britain. *U. vulgaris*, Greater Bladderwort, or Hooded Milfoil, is not unfrequent in ditches and deep pools.

UTTOXETER. [Staffordshire.]

UVA'RIA, a genus of plants of the natural family of *Anonaceæ*, so named from *uva*, 'grape,' its fruit growing in bunches like grapes. This genus is nearly allied to *Unona*. *U. zeylanica* is a rambling shrub, a native of Ceylon, with scarlet starry flowers, and eatable fruit. The species form trees or shrubs. They are natives chiefly of India and the Indian islands, with a few in Africa.

U'VULA is the small cylindrical body which hangs at the middle of the posterior margin of the soft palate. It is covered by a continuation of the mucous membrane of the palate, and contains in its interior some minute glands, and a muscle which has the power of elevating and shortening it.

UVULA'RIA, a small genus of the natural family of *Melanthaceæ*.

UXBRIDGE. [Middlesex.]

UZERCHE. [Corre'ze.]

UZES. [Gard.]

V, as pronounced by the English, is the pressed or medial labial aspirate, bearing the same relation to *f* that *b* does to *p*. Its form is only a variety of the character by which the vowel *U* is denoted, the latter being in its origin the cursive character employed with soft materials, while *V* is better adapted for writing on stone. The Roman letter *U* was probably pronounced as a *w*, a supposition which would explain the fact that in the alphabet of that language one character is employed for both *u* and *v*. The converse of this appears in the German alphabet, where *w* has nearly the power of *v*, while the latter symbol is used to designate the sound of the English *f*.

v is interchangeable with *b* and *m*. [See B and M.] It is also interchangeable with *f*, and hence the confusion between the characters *f*, *v*, and *w*. For the changes with *w*, *gu*, *du*, see W.

VACCINA'CEÆ, a natural order of plants belonging to Lindley's polycarpous group of Monopetalous Exogens. The species of this order are shrubby plants. They are common in Europe, and abundant in North America, extending to very high northern latitudes, and are not uncommon on high land in the Sandwich Islands.

The properties of this order closely resemble those of *Ericaceæ*. The bark and leaves of many of the species possess astringent properties, and are slightly tonic and stimulating. The fruit of many of the species possess acid and saccharine properties, and are used as articles of diet under the names of Cranberry, Bilberry, and Whortleberry.

VACCINATION. [JENNER; SMALL-POX.]

VACCI'NIUM, a genus of plants, the type of the natural order *Vaccinaceæ*.

V. myrtillus, the Common Bilberry or Bleaberry, is abundant in Great Britain, especially in the north, and in hilly districts of the south. The blossoms of this plant are elegant. It flowers in May, and its berries are ripe in the autumn. In the north of England and Scotland the berries are gathered and used for making tarts; in Devonshire they are eaten with clotted cream. *V. uliginosum*, Great Bilberry, or Bog Whortleberry, is a native of Great Britain, and is found in mountainous bogs in Cumberland and Westmorland, but is more frequent in the Highlands of Scotland, being found nearly on the summits of the highest mountains. Its berries are very similar to those of the common whortleberry, but their flavour is not so agreeable. It is a native of Iceland, and the inhabitants gather its leaves, with those of *Lycopodium alpinum*, in order to procure a yellow dye for colouring woollens. *V. Vitis-idæa*, Red Whortleberry, or Cowberry, is a low straggling shrub, with leaves resembling those of the Box, and pale flesh-coloured flowers. It is a native of dry places on heaths, mountains, and in woods, throughout Europe. It is plentiful in the north of England, Westmorland, Derbyshire, and Wales. The berries are red, and possess acid and astringent properties. They are hardly eatable raw, but they are made into pies in Derbyshire, and eaten by the common people. *V. stamineum*, the Green-Wooded American Whortleberry, has a trunk two feet high, giving out numerous green branches, which are downy while young. The flowers are white with ten stamens, and are succeeded by greenish or white berries, which are called Dewberries. It is a native of North America from New England to Florida. A variety is found in Mexico. It is a pretty garden shrub, and often cultivated. *V. corymbosum*, the Naked Flowering Whortleberry, is one of the largest of the species, attaining a height of seven or eight feet. *V. frondosum*, the Blunt-Leaved Whortleberry, or Blue Tangles, is a native of America from New Jersey to Carolina, in open woods. *V. arctostaphylos*, Oriental Bearberry, or Bear's-Grape Whortleberry, attains a height of five or six feet, and is a native of the coast of the Black Sea. *V. padifolium*, the Madeira Whortleberry, or Bird-Cherry-Leaved Bear's Grape, is found on the loftiest parts of the island of Madeira, where it forms impenetrable thickets. Pallas describes the berries as black, juicy, eatable, and gratefully acid.

VACHELLIA, a genus of plants belonging to the natural order *Leguminosæ*. *V. Farnesiana* is a native of the East and West Indies and Africa. The bark exudes a considerable quantity of gum. The flowers when distilled yield a delicious perfume.

VA'CUUM, or VOID, the name given in physics to the idea of space wholly free of matter, or perfectly empty. In the common phrase, space is called empty when, so far as air can fill space, it is full of air; and even in a more scientific form of speech, there is said to be a vacuum when there is only such an approach to a vacuum as the operations of philosophy can procure. Thus in the vacuum of the air-pump, however long the attempt at exhaustion may be continued, there is always air left, though in a highly attenuated state; and even in the mercurial vacuum, or in the space which is left over the mercury of the barometer, there is not unfrequently a slight portion of air, and always an atmosphere of the vapour of mercury. Physically speaking, it is perhaps impossible to procure a vacuum: it is most likely that, even if a real vacuum could be procured for an instant, air or other vapour would at once begin to be disseminated from the sides of the vessel in which the vacuum was made, and that the vacuum would thus instantly cease to exist.

But the question of the existence of vacuum, in its strict and absolute sense, and as to whether

such a thing were possible or not, was a subject of controversy from before Aristotle to after Newton.

Descartes denied the very possibility of a vacuum. There is in his writings an absolute and palpable confusion between *space* and *matter*, to the extent of an assertion that the destruction of all the matter in a certain space would be the destruction of the space itself.

Probably the manner in which the reader is most familiar with the use of the word vacuum is in connection with what he may have seen written on the maxim 'Nature abhors a vacuum;' a doctrine which, though common among the followers of Aristotle, must not, any more than many others, be taken as emanating from that philosopher himself. This is usually cited as a proof of the puerility of the ancient and middle philosophy—we think, somewhat unjustly. The personification of Nature is common to all times, and we are in the habit of saying that Nature exhibits phenomena, conceals her operations, uses the simplest means, &c. Now Nature may as well abhor, as exhibit, conceal, or employ; and where intelligence is understood, all who use the word Nature mean the God of Nature: while when the mere operations are referred to, Nature is only the personification of the collective body of second causes. As the statement of a fact, it is *true:* Nature *does*, to the best of our knowledge, abhor a vacuum; *she* (if we may personify her) never suffers it to exist to the extent of allowing any space which is perceptible to our senses to be vacuous. But if the adage were meant to supply a reason for the fact, those who used it were deceiving themselves, but not so that the most of those who would laugh at them would have any reason in their mirth. It is the error of every period to use words expressive of a fact observed in the sense of assignment of a reason for that fact; and the centuries which have always been ready with their *fluids* to stand for the causes of heat, electricity, magnetism, &c., should not be too hard upon the preceding ages, which put the feelings of nature in the place which they rather prefer to occupy by hypothetical gases.

VAGA, PIERINO DEL, or *Pierino Buonaccorsi*, was born at Florence in 1500. He lost his parents when young, but found a protector and teacher in the painter Andrea de' Ceri. He worked afterwards for Ridolfo Ghirlandaio, and finally with a Florentine painter of the name of Vaga, who took him to Rome, where he was employed in assisting Giovanni da Udine in the arabesques and stucco-work of the loggie of the Vatican. He assisted also Polidoro da Caravaggio in his chiaro'scuri, and exhibited so much ability that he became a favourite with Raphael, who entrusted him with the execution of some of his designs in fresco, and they are amongst the best painted in the loggie. He painted many other works in Rome: the best is considered the Creation of Eve in the church of San Marcello. Vaga left Rome at the sack of that place in 1527, and repaired to Genoa, where Prince Doria took him into his service, to superintend the decoration of his new palace. Vaga returned to Rome after staying some years at Genoa. He died in 1547.

VAGABOND. [VAGRANT.]

VAGRANT. This term, which simply denotes 'a wandering person,' is derived from the Latin *vagor*. It was probably introduced into our law language from the Norman-French. Modern laws have given to the word 'vagrant' an extended meaning, in the application of which the notion of wandering is entirely lost.

In England various statutes and ordinances have been passed to obviate the inconveniences arising from wandering mendicancy. These statutes were very numerous from the 23 Edward III. (1349) to the end of the reign of Henry VIII. But notwithstanding these laws, vagrancy appears to have greatly increased at the beginning of the reign of Edward VI.

About the beginning of the reign of Elizabeth, a description of persons called *rogues* first appear in the general class of vagrants. In this reign the evils of vagrancy increased very much, to remedy which, the statute 39 Eliz., c. 3, was passed, which made those provisions for the legal relief of the poor which a few years afterwards were completed by the stat. 43 Eliz., c. 2. The same committee also recommended measures for encouraging the building of 'hospitals, or abiding and working houses' for the poor, and for improving and reforming such as were already in existence, but had been misapplied or abused. And at the same time they introduced a more rational enactment for the correction and suppression of fraudulent vagrancy. (39 Eliz., c. 4.)

The laws relating to vagrants continued substantially upon the footing of the statutes of 39 Eliz., and a subsequent statute, 7 Jac. I., for more than a century, until, in 1744, they were reconsidered and remodelled by the stat. 17 Geo. II., c. 5. This was the first legislative measure which distributed vagrants into the three classes of idle and disorderly persons, rogues and vagabonds, and incorrigible rogues. The present law as to vagrants is contained in the 5 Geo. IV., c. 83. This act was amended by the 1 Vict., c. 38 (1838). The third section of the stat. 5 Geo. IV. declares what persons are idle and disorderly persons, and may be committed by a single magistrate to hard labour in the house of correction for any time not exceeding one month.

Although the modern statute is in many respects an improvement of the law, it is liable to some of the objections which were made to the 17 Geo. II., c. 5, and to others of a graver character. It is by no means exclusively a Vagrant Act; its provisions extend to various offences not necessarily connected with vagrancy. Under the former statute, a single magistrate had only the power of summary commitment for a month in the case of idle and disorderly persons, or to the next sessions in case of rogues and vagabonds and incorrigible rogues. But, under the recent act, a single magistrate has the power of committing rogues and vagabonds to prison with hard labour for three months. If the offences to be punished had been precisely defined by the statute, this extensive summary jurisdiction might have been less objectionable; but the language of the law is very loose. For instance, who are to be considered

'suspected persons,' or 'reputed thieves;' or what is to be taken for an 'unlawful purpose,' or 'frequenting a street,' are often questions of difficulty to practical lawyers, and may occasion hesitation and differences of opinion even among those to whom the final interpretation of penal laws belongs. This vagueness of expression is peculiarly dangerous in a law which gives large judicial power to unprofessional persons, who are for the most part withdrawn from the control of public opinion in the exercise of it; where the subjects and objects of the law are nearly connected with local excitements and prepossessions; and where the parties who suffer from misdecision are commonly the poor and helpless, to whom an appeal is wholly inacessible.

VA'HEA, a genus of plants of the natural family of *Apocynaceæ*, so named from *Vahé*, the name of one of the species, *V. gummifera*, in the island of Madagascar, where it is said to yield an excellent kind of caoutchouc.

VAHL, MARTIN, a botanist, was born, Oct. 10, 1749, at Bergen, in Norway. He was a student at the university of Copenhagen in 1766, where he imbibed a taste for botany, and in consequence removed to Upsal, where he became one of the most distinguished pupils of Linnæus.

In 1779 Vahl was appointed lecturer at the Botanic Garden of Copenhagen, and in 1782 he was appointed by the king of Denmark to undertake a scientific tour, during which he visited Holland, France, Italy, Spain, Barbary, Switzerland, and England. In these various countries he made large collections of plants, and visited their principal museums.

On his return to Copenhagen in 1785 he became professor of natural history in the university, and was entrusted with the continuation of the 'Flora Danica,' already commenced by Œder. In 1790 he commenced a work entitled 'Symbolæ Botanicæ.' In 1796 he commenced the publication of his 'Eclogæ Americanæ,' which was a sequel to the 'Symbolæ.' In 1799 and 1800 the government again paid his expenses in visiting Holland and Paris, for the purpose of examining botanical specimens. On returning to Copenhagen from this visit, he was appointed professor of botany in the university. He lived to complete only one volume of his great work entitled 'Enumeratio Plantarum.' This was published in 1804: he died Dec. 24 of the same year. Since his death, five more volumes have been published. Vahl also paid attention to zoology, and made some valuable contributions to that science.

VA'HLIA, a genus of plants of the natural order of *Saxifrageæ*. Though the genus Vahlia belongs to a family of plants indigenous in cold and temperate climates, it is itself found only in hot parts of the world, as Egypt, Senegambia, the Cape of Good Hope, and the peninsula of India.

VAILLANT, JEAN FOY, was born at Beauvais, May 24, 1632. He studied medicine, of which he was made doctor at the age of twenty-four. An accident led him to the study of ancient coins; and his knowledge of this subject having attracted the attention of Colbert, that minister commissioned him to travel through Italy, Sicily, and Greece for the purpose of collecting ancient medals for the king's cabinet. In 1674 Vaillant published 'Numismata Imperatorum Romanorum Præstantiora, à Julio Cæsare ad Postumum et Tyrannos.' In the same year he was sent out a second time by Colbert, in search after ancient coins. He embarked at Marseille for Rome, but the vessel being captured by an Algerine corsair, Vaillant was kept in slavery for upwards of four months, and it was only after much suffering that he at length arrived in France. Soon afterwards he was sent out on a third expedition, during which he travelled through Egypt and parts of Asia. He returned to Paris in 1680, and brought with him a large collection of coins, which were incorporated in the king's cabinet, the whole arrangement of which was entrusted to him. In 1681 he published 'Seleucidarum Imperium, seu Historia Regum Syriæ ad fidem Numismatum accommodata,' 1 vol. 4to. In 1702, when Louis XIV. gave a new constitution to the Academy of Inscriptions, Vaillant was made a member, and soon after a pensionary of it. He died Oct. 23, 1706.

His works, which are numerous, have been nearly superseded by the more recent investigations of Eckhel and Sestini; but they were of considerable merit when published, and it should not be forgotten that he cultivated Numismatics at a time when the science was in its infancy.

VAILLANT, SEBASTIAN, was born May 26, 1669, at Vigny, near Pontoise. At an early age his tastes were towards botany, but his father destined him for the musical profession, in which he made so much progress, that at the age of eleven he was appointed organist in a Benedictine convent, and shortly afterwards organist in a nunnery near his native town. His progress in anatomical and medical science was also great, and he was made assistant-surgeon to a neighbouring public hospital. The Marquis de Goville, a captain of the royal fusileers, next appointed him surgeon to his company, but his patron having been killed at the battle of Fleurus, he left the army, and came to Paris in 1691. The lectures of Tournefort now awakened his long-forgotten passion for plants, and he resolved to devote himself to the study of botany. Fagon, first physician to the king, made him his secretary, and appointed him a director of the Jardin du Roi, and in 1708 resigned in his favour his professorship and subdemonstratorship. Vaillant was also commissioned by the king to form a museum of materia medica. In 1716 he was elected a member of the Academy of Sciences. He died, May 26, 1722. His posthumous work, entitled 'Botanicon Parisiense,' was published at Leyden in 1727. His other productions consisted of lectures, and papers in which he attacked the system of arrangement pursued by Tournefort.

VAILLANT, FRANÇOIS LE, was born in 1753, at Paramaribo, in Dutch Guiana, where his father was French consul. In 1765 his family returned to Europe and settled at Metz. Here Le Vaillant, who had from a very early age collected objects of natural history, and arranged

them on a system of his own, found a fresh stimulus to his favourite pursuits in the ornithological cabinet of M. Bécœur. These pursuits were in him the indulgence of a passion, and when in 1777 he went to Paris, he became dissatisfied with his situation, and formed the project of investigating the yet unexplored regions of the earth in search of new varieties of birds. With this object he quitted Paris, unknown to his friends, in July, 1780, repaired to Amsterdam, and embarked in December for the Cape of Good Hope, where he arrived in March, 1781.

Le Vaillant remained in the colony till July, 1784, and returned to Paris in 1785. During the time he was in the colony he made two exploring excursions: the first was from Dec., 1781, to April, 1782, proceeding from Cape Town westward to the Great Fish River, which he traced upwards to about the spot where Beaufort now stands, and to some distance within the country of the Caffres. His second excursion, begun in April, 1783, lasted sixteen months, when he advanced northward beyond the Orange River, but how far is uncertain.

The narrative of his first expedition was published in 1790. In 1796 the second part of his Travels appeared. The first volume of the 'Natural History of the Birds of Africa' was published the same year; it was followed at intervals by four others; the sixth appeared in 1812; and Le Vaillant at his death left two additional volumes in MS. The 'Natural History of Parrots,' in 2 vols., was published 1801–5; 'The Natural History of Birds of Paradise,' 1801–6; 'The Natural History of Cotingas,' 1804; 'The Natural History of Calaos,' 1804. Le Vaillant died in retirement near Lauzun, Nov. 22, 1824, having been saved from the guillotine thirty years before only by the death of Robespierre.

VAL-DE-PEÑAS. [Castilla-la-Nueva.]

VAL-SESIA. [Novara.]

VALAI'S (*Wallis*), a Swiss canton, consists of the basin of the Rhône from the source of that river to the lake of Geneva. A small portion of this basin, however, which lies on the right bank of the river between the Dent-de-Morcles and the lake, belongs to Vaud. [Switzerland; Rhône.]

The area is 1658 square miles, of which more than one-half consists of high alps and glaciers, and the remainder of lower offsets and intermediate valleys. The breadth of level ground in the valley of the Rhône varies from a quarter of a mile to three miles. The heat in the summer is very great in the valley, especially in the neighbourhood of Sion and Sierre, where the fig, mulberry, almond, and pomegranate, thrive in the open air. The vine, Indian corn, barley, and potatoes, are cultivated. Walnut, chestnut, cherry, apple, and pear-trees, are abundant. In several localities excellent wine, both white and red, is made. Cider is made in other districts. In common years the crop of corn is sufficient for the consumption. The forests are extensive: great quantities of timber are cut down, and sent by the Rhône into France. The horned cattle, sheep, and goats, are numerous; horses and mules are not so. Mines of iron, copper, lead, silver, cobalt, and zinc, have been found. There is little manufacturing industry in the country. The population in April, 1850, was 84,059, all Catholics but 430. A patois of the Romance is spoken in the western part of the canton; German in the eastern part.

The principal towns of the Valais are the following:—*Sion*, or *Sitten*, an old-looking town, surrounded with turreted walls and a ditch, in a picturesque situation at the foot of two rocky hills, on the right bank of the Rhône: it gives title to a bishop, and has a large cathedral, a fine old town-house, a college, a curious old tower, said to have been raised by Charlemagne, two ruinous old castles on the summit of the two hills, an hospital, an arsenal, and about 2400 inhabitants. *Sierre*, or *Siders*, 10 miles E. of Sion, is a large village in a beautiful and fertile country: it has some fine houses, belonging to some of the wealthiest families of the Valais. There is an old turreted castle in the neighbourhood. *Brieg*, in the Upper Valais, a handsome village near the foot of the Simplon, has a college and church with a library, a convent of nuns, and some other good buildings. *Martigny*, the chief town of the Lower Valais, built on the site of the ancient Octodurum, has several good buildings, inns, and shops, and above 3000 inhabitants, including the territory of the commune. The high-roads over the Simplon and the St.-Bernard pass through Martigny. *St.-Maurice*, a small town of 1300 inhabitants, on the left bank of the Rhône, 10 miles below Martigny, is remarkable for its Augustinian abbey, annexed to which is a college, and a valuable library. The hospice of the St.-Bernard is in the Valais. [Bernard, St.; Switzerland.]

VALCKENAER, LOUIS CASPAR, was born in 1715 at Leeuwarden in Friesland. In 1741 he was appointed professor of Greek at Franeker, in the place of Hemsterhuis. In 1755 he obtained the professorship of Greek and of archæology in the university of Leyden, which office he held until his death in 1785. Valckenaer was a distinguished scholar, and excelled particularly in a critical knowledge of the Greek language. Besides writing many essays, he edited the grammarian Ammonius; the 'Phœnissæ,' and 'Hippólytus' of Euripides; and the 'Idyls' of Theocritus, Leyden, 1773, 8vo.

VALCKENAER, JAN, the only son of Louis Caspar Valckenaer, was born at Leyden, 1759. He studied jurisprudence in the university of Leyden, and was afterwards appointed professor of the same department in the university of Franeker. His reputation as a distinguished jurist, and his political sentiments, for he was one of the leaders of the anti-Orange party, procured him, in 1787, the professorship of jurisprudence in the university of Utrecht. But in the same year the party of the hereditary Stadtholder of the Netherlands, William V., were victoriously established by the armed assistance of Prussia, and Valckenaer was obliged to quit Holland. On the 6th of February, 1793, Valckenaer, together with other representatives of the patriots, presented himself at the bar of the National Assembly of France, and requested them to send an army into Holland to support the

party of the patriots. In 1795 a French army under Pichegru made its appearance in the Netherlands, and Valckenaer returned to Holland, and was appointed professor of public law in the university of Leyden. In the beginning of 1796 he was sent as ambassador of the Batavian republic to Spain. He returned to Holland in 1799, but was sent again in the same year as minister plenipotentiary to Madrid. He remained there till 1801. On the 16th of March, 1810, Louis Napoleon, king of Holland, sent Valckenaer on a mission to Napoleon, to prevent the incorporation of the Low Countries with France. A few months after Louis Bonaparte abdicated the crown of Holland, and Valckenaer spent the rest of his life in retirement. He died near Haarlem in January, 1821.

VALDARNO. [ARNO.]

VALDENSES. [VAUDOIS.]

VALDIVIA. [CHILE.]

VALENÇAY. [INDRE.]

VALENCE. [DRÔME; TARN-ET-GARONNE.]

VALE'NCIA, a province of Spain, is bounded E. by the Mediterranean, S. by the province of Murcia, W. by those of Cuença and Teruel and the Sierra de Albarracin, and N. by the province of Lerida. Until the year 1832 Valencia was called a kingdom, having once formed part of the crown of Aragon; but it was then divided into three provinces, Valencia, Castellon de la Plana, and Alicante. A large proportion of the surface, particularly in the north and west, is mountainous, but the plain country, which stretches along the coast, and is watered by the rivers Xucar, Guadalaviar, and Segura, is one of the most fertile and best-cultivated districts in Europe. The plain or vega of Valencia is about 30 miles long and 20 wide: on three sides it is bounded by the mountains of Segura, and on the fourth by the sea. The whole of this vast extent is planted with olive, mulberry, ilex, algaroba, orange, and palm-trees, and has the appearance of an immense garden. Such is the fertility of the soil that two and three crops in the year are generally obtained. The rice crops are the most valuable, and are chiefly produced in the tract which is irrigated by the Albufera, a large lake in the neighbourhood of Valencia. [ALBUFERA.] The other chief product is the white mulberry, for the feeding of silk-worms: the produce of silk from the vega of Valencia amounts to above one million of pounds yearly, a great part of which is exported in its raw state to France. The export of fruit from Valencia is also considerable; of raisins, the quantity exported has in some years been close upon 150,000 cwts. to England alone. The exports of barilla, almonds, figs, oil, saffron, wool, brandy, and wine, from different ports of Valencia is also very great, particularly the wine called Beni Carlo, which comes from a town of that name.

No great number of cattle or horses are kept; and the sheep, though numerous, yield wool of indifferent quality. Mercury, copper, sulphur, arsenic, gold, silver, lead, iron, coal, and antimony, are among the mineral products. Woollen, linen, and silken goods are made in several towns of the province, but chiefly for home consumption. Cordage made from the fibre of the esparto, mats, tiles, soap, glass, paper, pottery, and earthenware, are exported to all parts of Spain. Salt is largely exported to Sweden.

The area of the kingdom of Valencia was 7651 square miles, and the population in 1832 was 957,104. The population of the province of Valencia was in the same year, 388,961; great numbers of the labouring population have emigrated to Algerie since 1840. The dialect spoken in the province, though much akin to the Catalonian, differs considerably from it, as it retains more of the Provençal.

(Cavanilles, *Observaciones sobre la Historia Natural del Reyno de Valencia*, Mad., 1795–97; Miñano, *Diccionario Geografico; Almanach de Gotha pour* 1851.)

VALENCIA *de Alcantara*. [ESTREMADURA, *Spanish*.]

VALE'NCIA DEL CID, a city of Spain, capital of the province of Valencia, 188 miles E.S.E. from Madrid, in 39° 28′ N. lat., 0° 24′ W. long., stands in a wide plain, called *La Huerta*, or the Garden, about 4 miles from the mouth of the Guadalaviar, which washes its walls and separates it from its suburbs, with which it communicates by five stone bridges of from ten to thirteen arches. Valencia was a city of some importance under the Romans. Under the Moors, who took it A.D. 712, the town was annexed to the empire of Cordova till about 1056, when for a short time the city and its dependent territories formed an independent kingdom. It was taken after several months' siege, about 1088, by the famous Cid Rodrigo Diaz de Bivar, from whom the city takes its surname *del Cid*. The Moors however soon compelled the Cid to evacuate the town, of which they remained masters till Sept. 29, 1238, when it was finally taken from them by Jayme I. of Aragon. After the union of Castile and Aragon, Valencia retained its own representative constitution till the reign of Philip V., who obliged the inhabitants to conform to the laws of Castile, on account of their opposition to his dynasty in the war of succession. Valencia was taken by the French under Suchet, in 1812, and held by them till June, 1813.

The city is nearly circular, and about $2\frac{1}{2}$ miles round: it is enclosed by massive walls built by the Moors, flanked at intervals by round towers. The gates are four; that of the Cid is very remarkable for its architecture. The older streets are narrow, crooked, and unpaved; but those which have been lately built are wider and tolerably well paved. The city is furnished with public sewers of great solidity, which are said to be the work of the Romans: it has also good quays, faced with stone and planted with trees. The cathedral is of mixed architecture, with a very lofty tower called 'el Miquelete,' from the top of which a commanding view of the whole huerta is obtained. It contains numerous richly-decorated altars, and several paintings by Valencian artists. The exchange, the custom-house, a palace built by Charles III., the archbishop's palace, the college of Pius V., and several noble residences, are worthy of notice. The university,

founded in 1411, is perhaps the best frequented in Spain, and was formerly famous for the study of medicine. The magnificent library attached to it was entirely burnt by the explosion of a shell during the Peninsular war: another library has since been formed with the books of the suppressed convents, as well as a gallery of paintings and sculpture, collected from the various religious houses in the province. Besides the university, there are at Valencia six colleges and many inferior academies.

The port of Valencia is at Grao, about two miles farther down the Guadalaviar. It is connected with the city by a broad planted avenue, which is a favourite promenade with the inhabitants. The harbour is suitable only for boats; large vessels anchor in the roadstead, which is exposed to the south and south-west gales. The imports are codfish, bricks, iron, coals, tobacco, colonial produce, hides, manufactured goods, linen, hardware, trinkets, Norway-deals, and Dutch cheese. The exports are composed of barilla, wine, raisins, almonds, lead, brandy, oranges, raw silk, saffron, oil, wool, bass mats and ropes, salt, liquorice, and aniseed. The inhabitants are chiefly devoted to agriculture, although many branches of trade flourish in the city. Velvets, taffetas, flowered damask, and other silk-stuffs are manufactured for the home market. Woollens, camlets, hats, table-linen, gauzes, artificial flowers, pottery and earthenware, glass, and paper, are also made in small quantities.

VALENCIENNES. [Nord.]

VALENS, FLA'VIUS, emperor of Constantinople, reigned from A.D. 364 to 378. He was a brother of Flavius Valentinian, who, after being proclaimed emperor in A.D. 364, made Valens his colleague, and gave to him the government of the Eastern Empire, and Constantinople as his capital. The year after his accession, while he was staying at Cæsarea in Syria, Procopius, a Cilician, assumed the purple at Constantinople. But the rebel was defeated by the generals of Valens, and beheaded A.D. 366. Two years afterwards Valens was engaged in war with the Goths, who in A.D. 369 sued for peace. In A.D. 375 his brother Valentinian died, and Valens was deprived of a wise adviser at a time when he was most in need of him. In the year following the Huns entered Europe from Asia, and after having subdued the Aláni, pressed upon the Goths north of the Danube, some of whom were likewise subdued. About 200,000 Visigoths took refuge in the Roman territory as suppliants, and obtained permission to settle in it. The Goths being soon dissatisfied with their new quarters, took up arms under Fritigern, and defeated the Romans, while Valens was residing at Antioch to watch the movements of the Persians. As the Goths still resisted the Roman commanders, Valens marched against them from Syria with an army of veterans. A decisive battle was fought near Adrianople, A.D. 378, in which the Roman army was cut to pieces, and Valens was burnt in his tent, to which he had been carried wounded from the battle.

VALENS, ABURNUS, a Roman jurist, whose age is partly determined by the fact that he cites Javolénus and Julianus ('Dig.' 4, tit. 4, s. 33), from which we may conclude that he was younger than both. Valens wrote seven books on Fideicommissa, from which there are excerpts in the 'Digest;' and there is also in the 'Digest' a passage from the seventh book of a work on Actiones.

VALENTINIAN I., FLA'VIUS, a Roman emperor, reigned from A.D. 364 to A.D. 375. He was a son of Count Gratian, and a native of Cibalis in Pannonia. He distinguished himself as a soldier in various campaigns. His mind was uncorrupted by the sophistries of the age, and his body was strong and healthy. After the death of Jovian, in A.D. 364, Valentinian was proclaimed emperor at Nicæa; but he divided the empire between himself and his brother Valens, reserving for himself the western portion. [Valens.] The frontiers of the empire were exposed to great danger during his reign. Valentinian chose Paris as the centre of his operations against the barbarians, and through his general, Jovinus, he gained a victory over the Alemanni in A.D. 366. In A.D. 368 the Alemanni renewed their attacks upon eastern Gaul, and plundered Mainz; but Valentinian drove them back, and took up his residence at Treves. He continued the war successfully against the Germans, and celebrated a splendid triumph at Treves. Theodosius, the father of the future emperor, who had recovered Britain, was sent, A.D. 372, to oppose the rebel Firmus in Africa. In A.D. 373 Firmus committed suicide. The Quadi and Sármatæ now invaded Pannonia, and Valentinian, quitting his residence at Treves, drove them back across the Danube. The barbarians sent to the Emperor to ask for pardon, and in the audience which was granted them at Bregetio, Valentinian fell into such a passion that he broke a blood-vessel and died, A.D. 375. This emperor was a man of ability and a wise administrator.

VALENTINIAN II., FLA'VIUS, was a son of Valentinian I. by his wife Justina, and was only four years old when his father died. Gratian, who had been raised to the rank of Augustus in A.D. 367, succeeded Valentinian I. in A.D. 375, and made his brother, Valentinian, his colleague in the empire, assigning to him the præfecture of Italy and the western part of Illyricum. The education of Valentinian was left to his mother, who brought him up as an Arian, which led to violent disputes between the imperial family and Ambrose, archbishop of Milan. The religious disputes in Italy induced Maximus, who after the death of Gratian (A.D. 383) was master of Gaul, Spain, and Britain, to aspire to the possession of the whole empire. Maximus invaded Italy, and Justina and her son fled for refuge to Theodosius, the emperor of the East. Valentinian was restored to his throne, A.D. 389, by Theodosius. After the death of his mother Valentinian abandoned his Arian heresies, which put an end to the religious quarrels. In A.D. 392 Arbogastes, who was now aiming at the sovereignty of the West, induced the Emperor to go to Vienne in Gaul. After a quarrel with Arbogastes, Valentinian was found strangled in his apartment, May, 392.

VALENTINIAN III., PLACI'DIUS, a Roman emperor, son of Constantius, by Galla Placidia. In A.D. 425, when he was only a boy of six years, his uncle, Theodosius II., raised him to the rank of Augustus, and assigned to him the western portion of the empire, which his mother Placidia was to govern in his name, though she was ill-fitted for such a task. Gaul was constantly invaded by fresh hosts of barbarians, but Aëtius compelled them to sue for peace. Africa, where Bonifacius had the command, was lost, and fell into the hands of Genseric, king of the Vandals. In A.D. 437 Valentinian went to Constantinople, and married Eudoxia, the daughter of Theodosius II. and Eudócia. After the death of Theodosius II., in whose reign the Eastern Empire had been ravaged and ransacked by the Huns, Attila, their king, invaded Gaul. But in A.D. 451 the Huns were defeated in the plains of Châlons by Aëtius, and driven across the Rhine. In the year following they invaded Italy, and, as Aëtius had not sufficient troops to meet them, the freedom of Italy was purchased by great sacrifices. The greatness of Aëtius had long nourished the jealousy of Valentinian, who in A.D. 454 assassinated him with his own hand. This worthless tyrant was himself assassinated in the following year.

VALERIAN. [VALERIANA.]

VALERIA'NA, a genus of plants the type of the natural order *Valerianaceæ*. The species of this genus are herbs or undershrubs. They are found in abundance in many districts both of the Old and New World.

V. officinalis, the Officinal or Great Wild Valerian, is a native of Europe, and by the sides of rivers and in ditches and moist woods is abundant in Great Britain. The root has a very strong smell, which is dependent on a volatile oil. It is very attractive to cats, and also to rats, and is employed by rat-catchers to decoy rats. It is employed also in medicine at the present day. The root, or more properly the rhizoma, with its root-fibres, of this species, particularly the variety termed *V. sylvestris*, is used in medicine. The medicinal action is chiefly due to the volatile oil and extractive. Valerian is considered a cerebro-spinal stimulant, large doses of it causing marked excitement of the nervous system, not only of the human race, but also of cats, which are remarkably fond of it. In the slighter forms of nervous diseases not dependent on any change of structure of the brain or spinal chord, valerian is of considerable utility. In several instances, especially if there be much acidity of stomach, its beneficial effects are increased by combination with ammonia. In other instances valerian (in powder) greatly heightens the tonic power of the Disulphate of Quinia, the absence of all aroma from which renders it inferior as a tonic to many of the other forms of administering bark.

V. rubra, the Red Valerian, is a native of the south of Europe, the Levant, the north of Africa, and of Mount Vesuvius. It is found occasionally wild in England; but as it is a very commonly cultivated plant, there is no reason to suppose that it is anything more than an outcast of gardens.

V. dioica, the Small Marsh Valerian, is abundant in some parts of Great Britain. Its roots are often substituted for those of the *V. officinalis*, but they possess little medical value. *V. pyrenaica*, the Pyrenean or Heart-Leaved Valerian, is a native of the Pyrenees, but has been abundantly cultivated in British gardens. *V. Phu*, the Garden Valerian, is a native of Europe, in Belgium, Alsatia, Switzerland, Silesia, &c. It has a thick matted pale-green root. The flowers are white, and give out a pleasant smell. *V. Celtica*, Celtic Nard, or Nard Valerian, is a native of France, Italy, Illyria, and Switzerland, in alpine districts. Its roots are sweet-scented. *V. Hardwickii*, Hardwick's Valerian, is a native of Nepaul. It attains a height of about three feet. The root has a strong scent like the common Valerian, and is used by the Hindoos in medicine.

VALERIANA'CEÆ, a natural order of plants belonging to Lindley's Aggregose group of Monopetalous Exogens. The order is composed of annual or perennial herbs or undershrubs. The species are natives of temperate climates or elevated positions in both the Old and New World. They are more abundant in the north of Asia, Europe, and South America, than in Africa or North America.

VALERIANELLA, a genus of plants belonging to the natural order *Valerianaceæ*. This genus includes about 25 species. *V. olitoria*, Common Corn-Salad, or Lamb's Lettuce, is an annual, from four inches to a foot high. It is a native of Europe, in corn-fields and cultivated ground, and is found abundantly in such situations, especially in a light soil in Great Britain. In France and Germany it is much eaten as a salad, and is frequently cultivated for that purpose in this country.

The other British species of the genus are *V. dentata*, Smooth Narrow-Fruited Corn-Salad; *V. mixta*, Sharp Rough-Fruited Corn-Salad; *V. eriocarpa*, Blunt Rough-Fruited Corn-Salad. All the species are innocuous, and may be eaten as salads.

VALERIANIC ACID, an acid obtained from valerian root, forms two hydrates, by combining with different proportions of water. One of these, the *Monohydrate*, is oleaginous, very fluid, of an acid penetrating odour, like the valerian root; its taste is acrid and sharp with a sweetish after-taste; it produces a white spot on the tongue.

Valerianic acid combines with bases to form salts, which are called *Valerianates*. The potash and soda salts are very soluble, deliquescent, and crystallise with difficulty. The valerianates of lime and barytes are also very soluble, but they are crystallisable and unalterable in the air; the magnesian salt crystallises in efflorescent needles.

Anhydrous valerianic acid is probably constituted of C^{10} H^{9} O^{3}.

VALERIA'NUS, PU'BLIUS LICI'NIUS, a Roman emperor, who reigned from A.D. 253 till 260. He was a Roman by birth, and descended of a noble family. In A.D. 253, when Gallus was murdered by Æmilianus, Valerian, who had the command of the legions in Gaul and Germany, hastened to Italy, but Æmilianus was put to death by his own soldiers before the arrival of Valerian, who was immediately proclaimed emperor. Valerian, who was now at least sixty years of age,

appointed his son Gallienus his colleague in the empire; but it was an unfortunate choice. Though Valerian was a man of good character, wise, and experienced, his reign was a series of calamities. While the empire was invaded by the Goths on the side of the Danube, Sapor I., king of Persia, disturbed the eastern provinces. Valerian marched against the Persians, who defeated the Romans near Edessa, and the Emperor was treacherously delivered up to Sapor, A.D. 260. He died in captivity, after suffering the greatest indignities from the Persian king. In the early part of his reign Valerian was tolerant to the Christians, but in the latter part he persecuted them.

VALERIUS FLACCUS. [FLACCUS, C. V.]

VALE'RIUS MA'XIMUS. An anonymous Life, in Latin, states that Valerius Maximus spent his youth and part of his early manhood in improving his education. He afterwards served in the army, and accompanied Sextus Pompeius to Asia. This Pompeius was consul A.D. 14, the year in which Augustus died. Valerius Maximus is the author of a work in nine books, entitled 'Exemplorum Memorabilium Libri novem, ad Tiberium Cæsarem Augustum,' which consists of short stories and anecdotes, taken from various writers. The compiler has preserved the remembrance of some things which we should not otherwise know; but he shows little judgment. One of the best editions of Valerius Maximus is by A. Torrentius, Leyden, 1726, 4to. There is an English version by Speed, London, 1678, 8vo.

VALE'RIUS PROBUS, MARCUS, a Roman grammarian, who was living in the time of Nero, was a native of Bérytus in Syria. According to Gellius, he wrote on the accent of certain Punic words, and on the secret meaning of the letters or symbols in the Epistles of C. Julius Cæsar to C. Oppius and Balbus Cornelius.

The work entitled 'De Interpretandis Notis Romanorum' is not that to which Gellius refers, for the work mentioned by Gellius was on secret writing, whereas this is on abbreviated writing, or stenography. There are several editions of this work. One of the best is by Lindebrog, Leyden, 1599, 8vo. The two books 'Institutionum Grammaticarum,' which bear the name of Valerius Probus, are supposed to be by another and a later writer. They were edited by Lindemann, in his 'Corpus Grammaticorum Latinorum,' Leipzig, 1831, 4to.

VALERIUS, PUBLIUS. [PUBLICOLA.]

VALERY, ST. [SOMME.]

VALERY-EN-CAUX, ST. [SEINE-INFE'RIEURE.]

VALETTA. [MALTA.]

VALLA, LORENZO, one of the most distinguished Latin scholars of the 15th century, was born at Rome, according to Drakenborch, in 1407, but according to others, five years later. He was the son of an eminent lawyer, was educated at Rome, and learned Greek under Aurispa. For a time he taught rhetoric at Pavia and Milan. In 1435 he went to Naples, where he is said to have taught King Alfonso I. the Latin language. But the freedom with which he treated Livy, and the manner in which he attacked historical and theological errors, drew upon him the enmity of contemporary scholars and theologians. After a short residence at Rome, he was compelled by the Pope to leave it, and, returning to Naples, he became, in 1443, private secretary to King Alfonso. He had still many enemies, among whom was Poggio. Some theological disputes in which he was involved made him leave Naples again, and he went to Rome. Pope Nicholas V. received him well, appointed him professor of rhetoric, and restored to him the place which he formerly held of canon in St. John in the Lateran. Finally it is said he was made secretary to the Pope. He died at Rome in 1457, or, according to other accounts, in 1465.

Valla was the best Latin scholar of his time. He is the first who pointed out inconsistencies in Livy's narrative. His collected works were published at Venice in 1492, and in a more complete form at Basel, in 1540. His 'Elegantiæ Sermonis Latini' has often been printed. He translated into Latin the Fables of Æsop, the Iliad, Thucydides, and Herodotus; but the translation of Herodotus was not completed when he died, and was finished by Pontanus. Valla does not appear to have known Greek very well. There are some severe remarks on his translation of Thucydides by H. Stephens, in the preface to his edition of Thucydides, 1563.

VALLADOLI'D, the capital of the Spanish province of Valladolid, 100 miles N.W. of Madrid, stands in 41° 40′ N. lat., 4° 42′ W. long., in a plain bordered by limestone hills, at the confluence of the Pisuerga and the Esguéva, and has 25,000 inhabitants. The city, which was the residence of several Spanish kings, is full of sumptuous edifices and palaces, which, though now untenanted and falling to ruin, give it a very imposing aspect. The Plaça Mayor, or great square, and the streets built on porticoes leading to it, are the only parts of the city which present some animation; the rest looks miserable and deserted. The cathedral, a splendid but unfinished edifice, was built by Juan de Herrera. The church and convent of the Benedictines, that of San Gregorio and Las Huelgas, are very handsome; but the college of San Pablo is the most remarkable edifice in Valladolid, from its general elegance and the exquisite finish of the bas-reliefs on its façade. The royal palace is also a very fine building of mixed architecture, but it suffered much during the Peninsular war. The cancilleria real, in which the High Court of Appeal for the two Castiles and the Basque Provinces sits, is a fine structure in the Tuscan order. Valladolid has a well-frequented university, founded in 1346, which was formerly celebrated for its school of jurisprudence; 8 colleges, one of which is for Irish Catholic students; an academy of the fine arts, which possesses a fine collection of models in sculpture, architecture, and painting; and a museum of painting and sculpture, formed lately of the works found in suppressed religious houses.

Valladolid was formerly an opulent commercial city; its manufactures of woollen stuffs are still of importance. Trade has considerably increased since the opening of the canal between the Pisuerga and the Duero. The neighbourhood pro-

duces good white wine, madder, silk, olives, and corn. Valladolid gives title to a bishop, and is the residence of a captain-general, and other public functionaries of the province. Columbus died in this city, May 20, 1506.

VALLA'RIS, a genus of plants of the natural family of *Apocynaceæ*. The species consist of a few twining shrubs, which are found in China, the Indian islands, and the plains of India.

VALLE, PIETRO DELLA, surnamed Il Pellegrino, was born at Rome, April 2, 1586. Possessed of an independent fortune, he spent his youth in literary pursuits. His verses procured him admission into the academy of the Umoristi. He next turned soldier, but saw little service. He afterwards became a pilgrim, and in that character embarked at Venice for the East, June 8, 1614, and continued an unsettled traveller till 1626. The letters written to his friend Schipano in the course of his travels, the first part of which was published in 1650, shortly before his death, are by far the most valuable of his works. After his return to Rome, he killed a coachman in a fit of anger, for which he was banished, but obtained the pope's pardon, returned, and died in Rome, April 20, 1652. The letters relating to Persia were published in 1659: the third part—his Indian travels and his return to Rome—was published in 1662. This work has been translated into French, Dutch, and German. An English translation of the last part was published in 1665. His accounts of countries are lively and accurate.

VALLIER. [DRÔME.]

VALLISNE'RI, or VALISNIE'RI, ANTO'NIO, was born May 3, 1661, and received his early education from the Jesuits at Modena. In 1613 he repaired to Bologna, where he studied medicine under Malpighi. In 1614 he graduated at Reggio, but returned to Bologna, to pursue his natural history studies. He visited Padua, Venice, and Parma, and in 1688 commenced practice as a physician in Reggio. In 1700 he became one of the medical professors of the university of Padua; and notwithstanding some opposition from the adherents of the ancient system, was made chief professor in 1711. In 1720 he was invited by Pope Clement XI. to become his physician, but he refused. In 1728 the Duke of Modena presented him with an order of knighthood. He was known by his writings and correspondence to men of science in Great Britain, and was elected a fellow of the Royal Society of London. He died Jan. 12, 1730.

Vallisneri published many valuable papers on the various departments of natural history. His works were published by his son, in 3 folio vols., Venice, 1733.

VALLISNE'RIA, a genus of plants, named after Vallisneri. The genus belongs to the natural order *Hydrocharaceæ*. The species of this genus are all water-plants. Several of them have been recorded as growing in Europe, New Holland, and America. The *V. spiralis* is found in Italy, in ditches near Pisa, and in the Rhône. There are two Australian species, and also an American and East Indian species.

VALOGNES. [MANCHE.]

VALOIS, LE, a district in France, comprised in the former province of the Ile-de-France, and now forming portions of the departments of OISE and AISNE. Compiègne, Senlis, Crespy, Villers-Coterets, and La Ferté-Milon, were its chief towns. Philippe III., king of France, gave the county of Valois (A.D. 1285) to his second son Charles, whose son Philippe became king of France. The kings of France from Philippe VI. to Henri III. inclusive, belonged to the house of Valois.

VALOIS, HENRI DE, commonly called by his Latinised name, Henricus Valesius, was born at Paris on the 10th of September, 1603, and was descended of an ancient noble family of Normandy. He was educated at Verdun, in the college of the Jesuits, and afterwards at Paris, in the college of Clermont, where he had the instruction of Petavius and Sirmond. In 1622 he went to Bourges to study jurisprudence, and after the completion of his studies he practised for several years as a lawyer. At last however he gave up his professional occupations altogether, and devoted himself entirely to literature. He worked so hard that he lost his right eye, and he was obliged to be assisted by a reader. He had a handsome pension from M. de Mesmes, for his father gave him only a stinted allowance, but on his father's death, in 1650, he was in independent circumstances. The French clergy applied to him for a new edition of the Greek writers on ecclesiastical history, which appeared in 3 vols. folio, with notes and a Latin version. In 1660 he received the title of historiographer to the king; and two years after he became blind. Up to 1664 he devoted himself to literature, but in that year he married a handsome young woman, who bore him seven children. He died in 1676.

Henri de Valois was one of the best of the great French scholars of the 15th, 16th, and 17th centuries, and his works are still useful.

VALOIS, ADRIEN DE, commonly called Adrianus Valesius, a younger brother of Henri de Valois, was born at Paris on the 14th of Jan., 1607. In 1646 he published the first volume of his great historical work of France, under the title 'Gesta Francorum, seu de Rebus Francicis.' The whole work consists of 3 vols. fol., and the last two appeared in 1658. This extensive and very learned work comprises the history of France only during the short period from A.D. 254 to 752. In 1675 he published a very useful work on the state of ancient Gaul, entitled 'Notitia Galliarum Ordine Alphabetico digesta,' fol. He died at Paris in 1692.

VALPARAISO, a large town and important seaport of Chile, situated in 71° 45′ W. long., 33° 2′ S. lat., 55 miles S. from Santiago, and 225 N. from Concepcion, consists chiefly of a long narrow street, built under a high cliff, and along the windings of the shore of the Pacific, and has 30,000 inhabitants. The houses, which are generally only one story high, are built in a very solid manner of sun-dried bricks. Painted piazzas are substituted for balconies almost at every house, and their different colours give the town a

gay appearance. The east end of the town, called the Almendral, is occupied by the wealthy citizens. The poorer classes reside in wretched habitations built of mud and reeds in the numerous gorges between the cliffs. The new custom-house, the exchange, two churches, and a few other public buildings, are handsome edifices. The streets are well paved. The Protestants have a cemetery and a place of worship. A handsome suburb on the cliff is chiefly inhabited by the foreign merchants, who are mostly British, American, and French. The harbour is good, with 9 fathoms water close in shore, of easy entrance, and sheltered from all winds except the north; it is defended by three forts and a battery on a level with the water. In 1809 only 9 vessels entered the harbour; in 1836 the number averaged 40 per month; in 1849 the total number of foreign vessels that entered was 968. The customs revenue for 1849 was 2,022,577 dollars. There are large ship-building yards, and extensive bonding warehouses. Many vessels engaged in the Pacific trade come to Valparaiso for provisions, which may be put on board without their dropping an anchor. Valparaiso is the central depôt for the produce of Chile. Large quantities of corn, and other articles of provisions, are shipped here for Callao, Panama, and San Francisco. Besides wheat, the chief exports are —copper (of which 76,515½ quintals were shipped in 1849), gold, and silver; tallow and hides; timber, indigo, wool, sarsaparilla, fruits, &c. The imports are—foreign manufactured goods, chocolate, tea, coffee, sugar, tobacco, hardware, &c., &c. The British exports to Valparaiso exceed a million sterling annually. The French and American commerce with this port is also very important. The trade of Valparaiso has greatly increased since the discovery of gold in California. Steamers ply regularly to Callao and other Pacific ports.

VALTELLI'NA, a division of northern Italy including the steep slopes of the Rhætian, the Bernina, and the Septimer Alps, between the Ortler Spitz and the Splugen, together with the valleys of the Maira and the Adda, from the source of these rivers to their entrance into the Lago di Como. The Adda rises in Stilfser Joch, and flows first S. and then W. by S. into the lake; the Maira rises in the Septimer Alps in Switzerland, and soon after entering Italy, passes Chiavenna, below which, after being joined by the Liro coming from the Splugen, it enters the Laghetto or upper lake of Como. The Italian part of the basin of the Maira forms the district of *Chiavenna*, the most western part of the Valtellina; the northern part of the basin of the Adda has been called the district of *Bormio*, while that part of the basin where the Adda flows westwards has been called Sondrio. These three districts together form the Austrian province of *Sondrio*, which has an area of 1253 square miles, and a population of 92,739, exclusive of military.

The province is bounded N. and E. by the Alps, which separate it from Switzerland and the Tyrol, S. by the provinces of Brescia and Como, and W. by a high ridge which runs S. from the Splugen, and separates the province from the Swiss canton of Ticino. The valley of the Adda between the lake of Como and the town of Tirano is the finest part of the province: it has a genial climate and a fertile soil. The heat is very great in summer. All the fruit-trees of Italy thrive there. It produces abundance of wine, Indian corn, millet, and wheat. It has excellent pastures and meadow-land, and its cheese rivals the best made in Lombardy. The slopes of the lower hills along the northern side of the valley are covered with vines planted in terraces. The level land along the banks of the Adda is not more than a mile and a half in breadth, the mountains rising gradually on both sides and forming numerous transverse valleys between their offsets. The southern ridge, which separates the district of Sondrio from the province of Bergamo, is a lower offset of the Rhætian Alps, which detaches itself from the Ortler Spitz, and runs in a south-west direction towards the lake of Como. Its principal summit is Monte Legnone, about 8000 feet above the sea. The district of Bormio, being more elevated than Sondrio, is colder and less fertile. The northern part of the district of Chiavenna is likewise an alpine country, but there is a fine plain between the town of Chiavenna and the lake of Como, which is as productive as any part of north Italy.

The principal towns are the following:—*Sondrio*, the capital of the province, is situated in a fertile territory on the right bank of the Adda, and near the confluence of the torrent Mallero, which rises in the glaciers of Monte dell' Oro in the Bernina range. It has a handsome cathedral, a gymnasium, a college, a court of justice, a theatre, an hospital, and about 4500 inhabitants. *Morbegno*, a well-built little town on the left bank of the Adda and at the foot of Monte Legnone, over which there is a pass leading into the province of Brescia. *Tirano*, a large village on the Adda, is exposed to the inundations of that impetuous river, which has repeatedly threatened it with destruction. Near Tirano is a handsome church cased with white marble and dedicated to the Virgin. An important fair is held here twice a year. *Chiavenna*, a pretty town on the Maira at the branching off of the two roads that lead from Italy into the Grisons (one by the Splugen and the other by the Septimer and the Maloya), has several churches, a town-house, a castle, an hospital, manufactories of silk, paper, and cloth made of amianthus. The population of Chiavenna is about 3000.

VALUE. [PRICE.]

VALVE is the name given to any apparatus by which, in an hydraulic or pneumatic machine, the bore of a pipe or any orifice may be alternately covered and uncovered, in order in the one case to prevent, and in the other to permit, the passage of the fluid.

The ordinary pump-valve, frequently called a Clack, consists of a piece of leather rather greater than the bore or orifice. Circular plates of lead or brass are fastened to the upper and lower surfaces of the leather; and the valve thus formed is capable, from the flexibility of the leather, of turning, as on a hinge, at the place of its connection with the rim. After a certain quantity of water has forced its way through the orifice, the

valve, by its weight, falls, and closely covers the orifice, so that the water above is in great part prevented from returning.

Frequently a narrow bar of metal is made fast across a circular orifice in the direction of a diameter, and two semicircular valves of leather, each of which is covered above and below with a brass plate of the same form, turn upon the sides of the bar as upon hinges. This is called the Double-Clack, or the Butterfly-Valve.

The conical or Spindle Valve is a metal body in the form of a frustum of a cone, the side of which makes an angle of 45 degrees with a diameter of the base, and its convex surface is ground so as to fit exactly the corresponding side of the orifice. It is usually employed as the safety-valve to the boiler of a steam-engine. The frustum is lifted up vertically by the pressure of the steam, and when the steam has passed, it falls back by its weight.

The valve employed for the usual air-pumps consists merely of a slip of thin bladder thoroughly soaked in oil, its breadth being little more than is necessary to cover the orifice. When the pressure of the atmosphere is in part removed from the barrel, some of the air which is in the receiver forces its way, by its elasticity, through the orifice, and escapes at the sides of the valve. The valves of machines for condensing air are like those of a rarefying pump, but they are placed in contrary positions.

VALVE, in Botany, is a term applied to several parts of plants. Its most common application is to the parts of dehiscent fruits, these parts being in most cases the representative of the carpellary leaf.

VAMPIRE. According to Dom Calmet's 'Dissertation sur les Vampires,' the vampire is a dead man, who returns in body and soul from the other world, and wanders about the earth, doing every kind of mischief to the living. Generally he sucks the blood of persons asleep, and thus causes their death. Those who are destroyed in this way become vampires. The only manner of getting rid of such unwelcome visitors is, according to this author, to disinter their bodies, to pierce them with a stake cut from a green tree, to cut off their heads, and to burn their hearts.

The superstition about the vampires is chiefly prevalent in some parts of eastern Europe; and it was during the five years from 1730 to 1735 that vampireism reached its height. The chief periodicals of that time contain accounts of cases of vampireism in Hungary; and many of them were the subject of judicial proceedings. The superstition is said to linger still in Hungary and in Greece.

VAMPIRE-BAT. [CHEIROPTERA.]

VAN, LAKE. [ARMENIA.]

VAN ACHEN, HANS, was born at Cologne in 1552. He was first instructed by a painter called Jerrigh, with whom he remained about six years. He studied also the works of Spranger, and went to Venice in order to acquire the Venetian style of colouring. From Venice he went to Florence and Rome, acquiring great reputation by several pictures, in particular a Nativity of Christ, painted for the church of the Jesuits at Rome. He visited Venice a second time, and whilst there accepted an invitation from Duke William of Bavaria to go to Munich. He was next invited to Prague, where he painted many pictures for the Emperors Rudolph and Matthias. He died at Prague in 1615.

Van Achen was one of the leading propagators of that heavy style which prevailed in Germany at the beginning of the 17th century. His principal works are at Munich.

VANA'DIUM, a metal discovered in 1830, has somewhat of a silvery lustre, is extremely brittle, is a conductor of electricity, and at common temperatures is not acted upon by air or water; when heated to low redness in the air, it burns and is converted into black oxide.

Oxygen and Vanadium combine to form two oxides. The *Protoxide* ($V^1 O^1$) is a black powder, has a semi-metallic lustre, and when made coherent by pressure conducts electricity like a metal; when heated in the air it combines slowly with oxygen, and becomes the *Peroxide* ($V^1 O^2$). *Vanadic Acid* ($V^1 O^3$) is brown when in powder and red when fused; it suffers no change when heated; it is tasteless, nearly insoluble in water, and quite so in alcohol.

Chlorine and Vanadium combine to form two *chlorides*, one solid and the other liquid. Two *sulphurets* of Vanadium are also known.

Salts of Vanadic Acid are generally yellow or orange-coloured, but are sometimes colourless.

VANBRUGH, SIR JOHN, was of Flemish descent. Beyond the fact that he was born in 1666, very little is known of his early history. Whether he was educated as an architect is uncertain; but we find him in 1695 appointed one of the commissioners for completing the palace at Greenwich. About the same time he began to distinguish himself as a dramatic writer; and of his talent for comedy his plays of the 'Provoked Wife,' the 'Relapse,' and the 'Confederacy' (the last founded upon Dancour's 'Bourgeoises à la Mode'), afford sufficient proof, and also of the levity of his disposition, if not of the licentiousness of his morals. After having erected for the Earl of Carlisle the noble pile of Castle Howard, which he commenced in 1702, he was much employed on other mansions in different parts of the country, though no public buildings are attributed to him except a theatre in the Haymarket, which afterwards became the original Opera-House, on the site of the present building. In 1703 he was appointed Clarencieux King-at-Arms.

After the battle of Blenheim in 1704, the House of Commons voted that a palace should be erected for the Duke of Marlborough, and Vanbrugh was appointed the architect. It was finally completed (after much dispute, delay, and loss to himself) according to the original model, and will always be a monument honourable to Vanbrugh.

Sir John Vanbrugh died at his house at Whitehall, March 26, 1726.

VAN CEULEN, or KEULEN, LUDOLPH, was born at Hildesheim, but neither the year of his birth nor the manner in which he was educated is known; and it can only be surmised that

his taste led him early to the study of elementary geometry and algebra. He taught the mathematics at Breda, and subsequently at Amsterdam; but his fame rests chiefly on the effort which he made to express by numbers the ratio which the circumference of a circle bears to its diameter. The determination of this ratio has engaged the attention of mathematicians from the time of Archimedes; and during the 16th century Metius, Vieta, Adrian Romanus, and Van Ceulen laboured, by extending the approximative processes, to reduce the error within narrower limits. The diameter being supposed to be the unit, Romanus obtained an expression for the circumference in numbers consisting of 17 decimals, and Van Ceulen computed one which extends to 34 decimals. It may be observed that the approximation has since been carried to a much greater extent by means of the well-known series for the value of a circular arc in terms of its tangent. Van Ceulen published at Delft, in 1596, a tract on the circle, in Dutch; and a translation of it, in Latin, was published by Snellius in 1619, under the title 'De Circulo et Adscriptis.' He wrote a few other works on algebraical and geometrical subjects. He died at Leyden in 1610.

VANCOUVER, GEORGE, was born in 1758. He served as midshipman on Cook's second voyage (1772–1775); and on the third voyage, in which that great navigator lost his life (1776–1780). Vancouver was created a lieutenant and appointed to the Martin sloop. In this and other vessels, he served chiefly in the West Indies, until Sept., 1789, when he returned to England in command of the Europe. In March, 1791, Vancouver was appointed to command a vessel called the Discovery, and the Chatham, an armed tender, on an expedition to the north-west coast of America. His instructions were, to receive the surrender of Nootka by the Spaniards; to make an accurate survey of the coast from 30° N. lat. northwards; and to inquire after any communications, by inlets, rivers, or lakes, between the coast and Canada. The expedition sailed from Falmouth April 1, 1791. The greater part of the north-west coast of America was carefully surveyed in boats under his directions. He entered the Shannon, on his return, Sept. 13, 1795.

In 1794 Vancouver had been promoted to the rank of post-captain. He was paid off at the conclusion of his voyage, and from that time till his death, in May, 1798, he was busied in preparing his journals for publication.

VANDA, a genus of plants, which gives its name to the tribe *Vandeæ*, of the natural family of *Orchidaceæ*. The name is that of one of the species, *Vanda Roxburghii*.

VAN DALE, ANTON, was born in November, 1638. He was engaged in mercantile operations up to the thirtieth year of his age, after which he devoted himself to the study of theology and medicine. After the completion of his studies he took his degree of doctor of medicine; but, besides his medical practice, he officiated for several years as a preacher among the Mennonites. He was appointed physician to the hospital at Haarlem, where he remained until his death, on the 28th of November, 1708. Van Dale's works are in Latin. One of them consists of two Dissertations on Oracles, 1700, 4to.

VANDALS. [BELISARIUS.]

VANDE'LLIA, a genus of plants of the natural family of *Scrophularineæ*, so named from Vandelli. The species are natives of warm parts of the world, such as India, Birma, China, and Brazil. The only species which has attracted any particular notice is *V. diffusa*, a native of Brazil. It is said to be emetic, and its decoction as useful in fevers and liver complaints.

VANDER HELST, BARTHOLOMEW, was born at Haarlem in 1613. He was one of the best portrait painters of his time. He painted likewise small historical pieces, and had great skill in landscape-painting.

In the town-house of Amsterdam there is a work by Vander Helst, which Sir Joshua Reynolds pronounced the best set of portraits forming a picture that he had ever seen. The date is 1648. Vander Helst was still living in 1668. The date of his death is uncertain.

VANDER HEYDEN, JAN, was born at Gorcum in 1637. He studied under an obscure painter on glass, and commenced without other instruction to paint pictures of old buildings, churches, palaces, and other architectural subjects. Sir Joshua Reynolds says that the works of Vander Heyden have 'the effect of nature seen in a camera-obscura.' There are several of his works in this country. One of his best is a view of the town-house of Amsterdam: it is now in the Louvre. He painted also a view of the Royal Exchange of London.

VANDER MEER, JAN. There were apparently three Dutch painters of this name, but the accounts of them do not agree. Some writers relate of only two artists what others relate of three.

Jan Vander Meer, the Elder, was born at Rotterdam in 1627. He painted in various styles, but excelled chiefly, according to D'Argenville, in small landscapes with figures, and in sea-pieces. In 1664 he was dean of the guild of painters in Amsterdam. The Prince of Orange gave him a situation under the government, and in 1674 created him a counsellor. The date of his death is not known.

Jan Vander Meer, the Younger, a relation of, and, according to some, the son of the preceding, was born in 1656. He painted chiefly landscapes with sheep and goats. He died in 1706.

The supposed third artist of this name is by some writers called Jan, and by others Jacob, but the accounts are too discrepant to enable us to say decidedly whether there were three or only two artists of this name.

VANDER MEULEN, ANTONY FRANCIS, was born at Brussels in 1634. He was the scholar of Peter Snayers, and painted some good battle-pieces in the style of his master while still very young. The French minister Colbert invited Vander Meulen to Paris, where he was allowed a pension by Louis XIV., besides being paid handsomely for his works.

Vander Meulen accompanied Louis XIV. to

the Netherlands in some of his campaigns, and made drawings of the sieges, battles, and engagements in which he was successful. Vander Meulen's principal works were in the Château de Marly. There are now many of them in the Louvre and others at Versailles. He died at Paris in 1690.

Peter Vander Meulen, the brother of the above, painted some battles for William III. of England: he came to this country in 1670. He was originally a sculptor.

VANDER VELDE, ADRIAN, born at Amsterdam in 1639, was a scholar of John Wynants. He excelled in landscapes and cattle, and he painted figures in the pictures of Wynants, Vander Heyden, Ruysdael, Hobbima, Moucheron, and others. Vander Velde executed likewise some historical pieces. He died in 1672.

VANDER VELDE, or VANDEVELDE, WILLIAM, called the Elder, to distinguish him from his son of the same name, was born at Leyden in 1610. He appears to have been bred to the sea; and having distinguished himself by some drawings of sea-fights, was commissioned by the States of Holland, in 1666, to accompany De Ruyter for the purpose of making designs of whatever engagements might take place between the Dutch and English fleets. He made drawings of the engagement which took place off Ostend, in June of that year. By these and other designs he acquired such a reputation that he was invited in 1675 to England by Charles II., who granted him a pension of 100*l.* per annum. After the death of Charles, James II. continued the pension. He died in London in 1693.

VANDER VELDE, WILLIAM, the Younger, was born at Amsterdam in 1633. He came early to this country, and lived probably with his father at Greenwich: he died in London in 1707. He was at first taught by his father, and afterwards by Simon de Vlieger. The works of the younger Vandervelde are very valuable: the best of them are in England. He left a son of the same name, who also painted sea-pieces, and made good copies of the works of his father. He died in Holland.

VANDER WERFF, ADRIAN, was born at Kralinger Ambacht, near Rotterdam, in 1659. He studied with Cornelius Picolett and Eglon Vander Neer, and at the age of 17 set up for himself as a portrait painter at Rotterdam. He next took to historical painting; and having attracted the attention of the Elector Palatine John William, that prince, in 1696, ordered two pictures of him, and afterwards took him into his service. After the death of the Elector, in 1716, Vander Werff was at liberty to dispose of his pictures to whom he pleased, and he sold them for very high prices. He died in 1722.

The pictures, or the greater part of them, painted for the Elector John William, which formed part of the Düsseldorf collection, are now in the Pinakothek at Munich.

VANDER WEYDE, ROGER, a painter of Brussels, born in the latter part of the 15th century. He was, according to Vanmander, one of the first to reform the style of design of the Flemish painters; he divested it considerably of its gothic manner, was correct in his proportions, and was successful in expression. He painted portrait and history: there are, or were, four very celebrated pictures by him in the town-hall of Brussels, illustrating remarkable acts of justice. Vander Weyde died in 1529, in the prime of life.

VAN DIEMEN'S LAND, sometimes called *Tasmania*, is an island and British colony situated in the southern hemisphere, south of Australia. It lies between 40° 45′ and 43° 45′ S. lat., and between 144° 45′ and 148° 30′ E. long. It is separated from Australia by Bass's Strait, which washes its northern shore. On the west of the island is the Indian Ocean, on the east the Pacific, and on the south the Southern Ocean. The greatest length is 230 miles; the greatest breadth is 190 miles. The area is about 22,630 square miles. The population in 1838 was 41,512, of whom 23,244 were free, and 18,268 convicts. The population at the beginning of 1848 was—

Free	43,692
Convicts	24,188
Military	2,246
Aborigines . . .	38
	70,164

Coast-line and Islands.—The western coast, beginning on the north at Cape Grim, and extending to South-West Cape, is about 240 miles long. It is less accessible than the other shores of the island, as in general it runs in a continuous line, being only broken by the two large inlets which form Macquarrie Harbour and Port Davy. The shores elsewhere are steep, exposed to a strong swell and surf, and without anchorage or shelter. The southern coast, between South-West Cape and Whale Head, is about 50 miles long, and runs in a serpentine line, forming several bays, of which a few have good anchorage. The south-eastern coast extends from Whale Head to Cape Frederik Hendrik, about 60 miles in a straight line. It contains a greater number of safe anchorages than probably any other country of the same extent on the globe; in fact there is hardly a mile along this coast-line which does not offer a safe refuge to vessels. This great advantage is owing partly to the size and form of the island of Brune, which extends along the coast, and partly to two far-projecting promontories, called Ralph's Peninsula and Tasman's Peninsula. The strait which divides Brune Island from the mainland is called D'Entrecasteaux Channel, or Storm Bay Passage, and extends 45 miles in a straight line. The eastern coast extends from the northern extremity of Forestier's Peninsula to Cape Portland on Bass's Strait, more than 150 miles in a straight line. Many parts of it are difficult of access, but there are many good anchorages and inlets, of which Oyster Bay is the largest. On this coast is Maria Island, which is about 12 miles long, and consists of two large masses of rocks connected by a neck of land. North of Maria Island, and near to Oyster Bay, is Schouten Island, which is about 6 miles long and 3 wide. The northern coast extends from Cape Portland on the east to Cape Grim on the west, and is about 160 miles long in a straight line. North of this coast is

Bass's Strait, at the eastern entrance of which is the group of the Furneaux Islands, which consist of two larger islands, four of moderate size, and many smaller islands. The larger, Great Island, extends 40 miles from N. to S., and is on an average 9 miles wide. South of Great Island is Cape Barren Island, which extends E. to W. about 20 miles, with an average width of about 5 miles. The strait which divides Furneaux Islands from Van Diemen's Land is called Banks's Strait, and is 10 miles wide.

Surface and Soil.—As the first European settlement on Van Diemen's Land was established about fifty years ago, it can be no matter of surprise that the country is imperfectly explored. Nearly one-half of the island is almost unknown, namely, nearly two-thirds of that portion which is south of 42°, and one-third of that which is north of that parallel.

The unexplored mountain-region, south of 42°, occupies the southern and western districts of the island, and reaches north-east to the banks of the river Derwent. This river, from its source in Lake St. Clair to its mouth, separates the well-known part of the island from that which is entirely unknown except the coasts and the districts in the immediate vicinity of the river. These districts are occupied by an apparently continuous mountain-range, which extends along the river at a short distance from its banks, and in some places sends off branches which advance close to the river. Many of the summits are 3000 to 4000 feet high. The remainder of this region is only known so far as it has been observed from the sea and a few places from the coast.

The Valley of the Lower Derwent extends from Mount Nelson upwards to the confluence of the Derwent with the Ouse, and is rather more than 50 miles long. It is a tract of great fertility. A hilly region extends from this valley eastward to the shores of the Pacific. North of this hilly region are elevated plains, crossed by woody tracts. Besides the Derwent, this region is watered by the Nive, the Dee, the Ouse, the Clyde, the Jordan, the Huon, Coal River, and Pitt's Water. Besides Lake St. Clair (10 miles long by 3 wide), there are Lake Echo (3 miles long by nearly 3 wide), Great Lake (20 miles long by 10 wide), Arthur Lake (30 miles in circuit), and Lake Sorel (nearly as large as Great Lake).

The watershed of the eastern districts of Van Diemen's Land N. of 41° 50′ S. lat. lies close to the Pacific. The mountains which extend along the shores of the Pacific, and connect the northern part of the Eastern Tier with the range of the Ben Lomond, constitute a high range, overtopped by several summits. Ben Lomond appears to be the highest ground in this part of the island, and is estimated to rise 4200 feet high. The valleys of the North Esk and South Esk are fruitful portions of this district. North of the upper valley of the South Esk extends a region, the whole of which is probably occupied by mountains; but the interior of it has not been explored, and only the outskirts of it are known. The gorge through which the South Esk flows above Launceston separates the valley of the Tamar, which lies north of it, from the Basin of Lincoln, which extends south of it. The Tamar is only a deep inlet of the sea, which begins at the town of Launceston, and where the two Esks fall into it. The tide flows up to Launceston. The Basin of Lincoln is the most fertile portion of Van Diemen's Land. It extends from S.E. to N.W. about 25 miles, and as much from N.E. to S.W.; it is watered by several large rivers, which unite, and ultimately fall into the South Esk. The rivers are, from east to west—Elizabeth River, Macquarrie River, Lake River, Pennyroyal River, and Mæander or Western River. Westward of this basin is the Western Tier, or Western Mountains, which extend from the banks of the Lake River to the sources of the river Mersey, a distance of about 50 miles. At its northern extremity the Western Tier is of considerable width, extending from Quamby's Bluff to Extreme Western Bluff, a distance of about 25 miles.

Proceeding westward from the banks of the Mersey, two high and steep mountain-ridges must be passed before that region is reached which is called the Surrey Hills, and which constitutes one of the most remarkable features of Van Diemen's Land. It seems to be of somewhat a square form, and each side is about 40 miles long. It gives origin to a great number of rivers, which run off in all directions. The region is elevated, cold, dry, and covered with good herbage. Between the valley of the Mæander and the Surrey Hills on the south, and Bass's Strait on the north, is the hilly region of Devonshire. West of the Emu River begins the Great Plain. It occupies the north-western portion of the island, extending along the northern coast from the Emu to Cape Grim, and along the western coast to the Arthur River. It consists of an alternation of plains, swamps, and forests; and contains only a few spots fitted for cultivation. The river Arthur, whose mouth is near 41° 10′ S. lat., is a river of considerable size, and brings down a large volume of water. The other known rivers of the northern part of the island are unimportant, with the exception of the Emu, which is navigable for boats for a few miles.

Climate and Productions.—In respect to climate there is a considerable difference between the climate of Hobart Town on the southern coast, and of Launceston on the northern coast. The climate of Hobart Town seems to be greatly influenced by the range of mountains west of the town, and the vicinity of the open ocean. Heat, cold, rain, and sunshine, succeed each other with a rapidity which is rarely observed in any other part of the globe. The winter is not more constant than the summer; the same alternations, with the addition of hail and snow, follow each other in quick succession. Thunder-storms are less frequent than in Australia, but violent gusts of wind sometimes occur, which cause great destruction in the forests. Along the western coast strong S.W. winds prevail nearly all the year round, and render this tract almost inaccessible on account of the want of harbours. The climate is very healthy: no epidemic or contagious diseases have been observed, and acute diseases are

generally mild and of short duration, and yield more easily to the usual remedies than in any other country.

The mineral wealth of the island is not much known. So far as it has been investigated it includes copper, iron, lead, zinc, manganese, coal, slate, salt, and sandstone. Little has yet been done in mining operations.

All grains cultivated in England succeed well. Wheat is of excellent quality, weighing generally from 62 to 64 pounds the bushel: considerable quantities are exported. Barley and oats will only thrive in a good soil. The vegetables and fruits of Europe are cultivated by the colonists in great abundance.

The domestic animals of Europe thrive very well here. Sheep are most numerous. Wool and live stock are exported to a great extent. Black cattle are also numerous, and many head are annually exported; and also some horses.

The spermaceti-whale is very abundant in Bass's Strait, and many of them are annually taken, but more by the inhabitants of Australia than by those of Van Diemen's Land. Black whales abound in all the seas round the island, and a very lucrative fishery is carried on along the southern coast. Whale-bone and train-oil are important articles of export. Most of the land animals are similar to those of the neighbouring continent. [AUSTRALIA.]

None of the forest-trees or shrubs yield an edible fruit. They are all evergreens. The most useful tree is the Stringy Bark Tree, which is used for building and fencing; and the Blue Gum Tree, of which most of the boats in the colony are built. The smaller trees are used for masts for small vessels.

Colonisation.—In 1803 Lieutenant Bowen, commissioned by the government of New South Wales, landed on the east bank of the Derwent, and formally took possession of Van Diemen's Land as a place of settlement. In the following year Colonel Collins, the first lieutenant-governor, arrived, and established the seat of government on the west bank of the Derwent: he gave to the spot the name of Hobart Town, in compliment to Lord Hobart, then secretary of state for the colonies. Colonel Patterson arrived in the same year in the Tamar, and formed an establishment on its west bank. Colonel Davy succeeded to the government in 1813, and under his administration the ports of the colony were first opened to commerce, only transport vessels from New South Wales having previously been admitted. Colonel Sorrell was appointed lieutenant-governor in 1817, and in 1819 the immigration of free settlers from England commenced, the colony having been previously exclusively formed of criminals sent from New South Wales for crimes committed there, and of the civil and military officers charged with their superintendence. Till the year 1824 the government was subject to that of New South Wales; but it was then made independent of that colony.

The most important steps in the progress of the colony were made between the years 1824 and 1836, during the administration of Colonel Arthur. The population increased from 12,643 to 40,283, and the exports increased from 14,500*l.* to 320,679*l.* Roads were formed and bridges constructed in different parts of the island; wholesome laws were introduced; and the fruits of enterprise and industry were secured by an improved police system. Extraordinary encouragements were held out to emigrants. Grants of land were made to them proportioned in extent to the capital which the colonist was prepared to invest in stock and in agricultural improvements.

In 1831 the system of colonisation by free grants of land was abolished, and since then land has been sold by auction. The colonists are now attempting to stop all future transportation of convicts to the island.

Trade and Commerce.—The efforts of the local government are rapidly extending improvements over the island. No fewer than 24 bridges were built by the government between 1842 and 1847. In 1847 5538 emigrants arrived in the colony from Great Britain, and 4787 departed from it (chiefly to Port Philip and South Australia). Among the greatest works now constructing is a bridge over the Derwent, on the high road from Hobart Town to Launceston; it is of wood, and will have twenty bays or arches of 32 feet span each.

The manufacturing establishments of Van Diemen's Land in 1847 included 46 breweries, 15 candle factories, 4 dye-works, 17 engineering and foundry works, 80 mills, 3 potteries, 10 printing-offices, 16 ship-yards, and 44 tan-works.

The revenue of the colony for 1847 was 150,474*l.*, and the expenditure 142,497*l.* The vessels which entered inwards were 617 (burthen, 86,940 tons); outwards 611 (burthen, 85,861 tons). The vessels built in the colony in that year were 12 (burthen, 1361 tons). The vessels belonging to Hobart Town were 140 (burthen, 11,521 tons); and those to Launceston 44 (burthen, 3373 tons). The value of the fisheries in that year was estimated at 70,000*l.* The live stock comprised 16,212 horses, 82,194 cattle, 1,833,866 sheep, and 2964 pigs.

The staple article of produce is wool. A considerable trade is carried on with South Australia and Port Philip, in sheep. Van Diemen's Land produces not only a sufficient supply of grain for domestic consumption, but has contributed for several years to supply the deficiency in New South Wales.

The total exports for 1847 were valued at 600,867*l.*; the four chief items were—wool (247,240*l.*), wheat (85,683*l.*), flour (40,595*l.*), and oil (63,165*l.*). The imports in the same year were valued at 724,593*l.*; the five chief items were—woollens (108,175*l.*), cottons (35,679*l.*), apparel and haberdashery (48,388*l.*), hardware (41,030*l.*), and sugar (51,615*l.*).

The grants of land in 1841-2-3 were 8067 acres. Since that time the lands have been sold. About 2,700,000 acres had been appropriated (either granted or sold) to settlers, by the year 1847. Of this quantity 150,000 acres were under crops, 64,000 acres being wheat crops.

Districts and Towns:—Originally Van Diemen's Land was divided into two Counties. It is now

divided into 19 Police Districts, which comprise an area of 12,774,960 acres. The land not yet divided into districts comprises 1,707,932 acres; giving an area for the whole island of 14,482,892 acres.

Hobart Town, the capital, is built upon an undulating surface, receding from a cove on the left bank of the Derwent. The streets are generally wide, and intersect each other at right angles. A narrow and shallow rivulet, which takes its rise from Mount Wellington, flows through the town, and affords the inhabitants their supply of fresh water. All the streets are macadamised or flagged. The houses are of brick or of stone. Many of the shops are respectable, and some are tasteful and elegant. There are several public buildings, and some of them are handsome. Large basins and quays have been constructed. The population in 1847 was 22,100, comprising 16,567 free and 5543 convicts.

Launceston, the second town of the colony, is situated at the confluence of the North Esk and South Esk, which there form the Tamar, 45 miles from its outfall into Bass's Strait. It is 124 miles N. by W. from Hobart Town. Launceston is situated in a marshy spot. It contains several public buildings and places of public worship. Convenient wharfs have been constructed. The population in 1848 was 10,100, of whom 7854 were free, and 2246 convicts.

A good highway extends from Hobart Town to Launceston, and there are inns along it at short distances from one another.

Richmond is situated on the Coal River, about 12 miles N.E. from Hobart Town, and contains a population of 8300.

Longford has a population of 3690. The other towns are smaller.

Government.—Van Diemen's Land is administered, under the 13 and 14 Vict., cap. 59, by a lieutenant-governor, who is assisted by an Executive Council and a Legislative Council, of whom two-thirds are elected and one-third nominated. The lieutenant-governor has the initiative of all laws. The judicature consists of a supreme court, courts of quarter-sessions, and courts of requests. In all the most populous districts of the island there are police magistrates.

Three religious denominations, the Episcopalian, Presbyterian, and Roman Catholic, receive allowances from the state. They are each provided for in proportion to the respective number of their communicants. A bishop of Tasmania was appointed in 1842.

VANDYCK, SIR ANTONY, was born at Antwerp, March 22, 1599. His father was a glass-painter of Hertogenbosch (Bois-le-Duc), and gave his son his earliest instruction in drawing. He is said to have been first the scholar of Van Balen, and was then placed with Rubens, under whom he made such progress as to be intrusted with the execution of some of his master's sketches.

At the age of 20 Vandyck set out for Italy. He spent some time in Venice and in Genoa, where he painted many excellent portraits. He next went to Rome, where he was also much patronised, and lived in great style. Whilst at Genoa Vandyck received an invitation to go to Palermo; whither he went, and was extensively employed. He soon however returned to Genoa, and thence to his own country.

Vandyck's first picture after his return to Antwerp was a St. Augustin, for the church of the Augustines in that place, by which he established his reputation as one of the first painters of his time. He painted several other excellent historical pictures, but acquired greater fame by his portraits. From Antwerp Vandyck went to the Hague by the invitation of the Prince of Orange, Frederick of Nassau, and painted many portraits at that court. About 1632 he was invited to England by Charles I., who lodged him at Blackfriars, knighted him in that year, and in 1633 granted him an annual pension of 200*l.* for life, with the title of painter to his Majesty, besides paying him handsomely for his works.

Vandyck was indefatigable in his application. He is said to have painted a portrait in a day. He acquired large sums, but his tastes were expensive, and his style of living not conducive to health. He died in London in 1641.

Vandyck is generally allowed to dispute the palm with Titian in portrait painting, and he is by some accounted upon the whole superior to him. Many of his best works are in this country, at Windsor Castle, at Wilton House, and at Blenheim, and in many other collections. His masterpiece, in the opinion of Walpole, is the portrait of the Earl of Strafford and his secretary Sir Thomas Mainwaring, at Wentworth House.

VANE, SIR HENRY, the Younger, was born about 1612. He was the eldest son of Sir Henry Vane, of Hadlow in Kent, knight, comptroller of the household and secretary of state to King Charles I. After some preparatory studies at Westminster School, he became a gentleman commoner of Magdalen Hall, Oxford; but, according to Wood, left the university in consequence of objecting to take the oaths of allegiance and supremacy. He spent some time in France, and more in Geneva, where he contracted an aversion towards the government and liturgy of the Church of England. In 1635 he went, for conscience sake, to the infant colony of New England, where he remained about two years. On his return to England he married; and, through his father's interest, was joined with Sir William Russell in the office of treasurer of the navy. In 1640 he was knighted. He sat for the borough of Kingston-upon-Hull in the parliament which met April 13, 1640, and again in the Long Parliament. Having been appointed treasurer of the navy, and considering the fees, which by reason of the war amounted to nearly 30,000*l.* a year, as exorbitant, he gave up his patent, only desiring that 2000*l.* a year should go to a deputy whom he had bred to the business. When the independents sprung up he became one of their leaders. He did not approve of the force put upon the parliament by the army, nor of the king's execution, and withdrew for some time from public affairs.

Upon the establishment of the Commonwealth he was appointed one of the council of state; and in 1652 was for a time president of the

council, and at the same time one of the commissioners of the navy. Towards the end of 1651 he was nominated one of the commissioners to be sent into Scotland in order to introduce the English government there.

Vane was one of those who would not submit to the usurpation of Cromwell. In 1656, as he persevered in his hostility, which he displayed in a book entitled 'A Healing Question propounded and resolved,' he was imprisoned for some time in Carisbrook Castle in the Isle of Wight. But he remained inflexible both under Oliver and his successor.

After Richard's abdication, the Long Parliament constituted Sir Henry one of the Committee of Safety, and also a member and afterwards president of the council of state. But he subsequently lost the favour of the house, and was banished for a time to his residence at Raby.

On the king's restoration Vane was one of the twenty persons excepted out of the Act of General Pardon and Oblivion. In July he was committed to the Tower. In Jan., 1660-61, an insurrection of the Fifth-Monarchy Men broke out, and Vane, who had countenanced them, was arraigned June 2, 1662, having been indicted for high treason before the Middlesex grand jury the preceding term. Vane, who was denied the assistance of counsel, spoke in his defence with great spirit and courage; but he was found guilty of high treason, and beheaded on Tower Hill, June 14.

Sir Henry Vane was the author of various publications, both political and theological. Of the latter the most remarkable is 'The Retired Man's Meditations,' &c.

VANGUE'RIA, a genus of plants of the natural family of *Rubiaceæ*, which has been so named from an alteration of its vernacular name in Madagascar. The species are few in number: the principal are *V. edulis* of Madagascar, and the Indian *V. spinosa*. The fruit of the *V. edulis* is eaten by the natives of Madagascar and of the Mauritius, where it has been introduced, as well as into Hindustan.

VAN HELMONT, SEGRES JACOB, born at Antwerp in 1683, was the son of a painter of Brussels, and was instructed in his art by his father. He excelled in composition and in colouring, and painted many works for the churches and for private persons at Brussels. The triumph of Elijah over the Priests of Baal, in the church of the Carmelites; the Martyrdom of St. Barbara, in St. Mary Magdalen; and the Triumph of David, in St. Michael's Church, at Brussels, are considered his masterpieces. He died at Brussels in 1736.

VANILLA, a genus of plants, the type of Lindley's natural order *Vanillaceæ*.

As the greater portion and the finest kinds of the Vanilla of commerce are imported from Vera Cruz, the most important species must be natives of Mexico.

V. aromatica, Aromatic Vanilla, is the *Epidendrum Vanilla* of Linnæus, and is a native of Brazil. Under this name have been included two or three species of Vanilla, one of which alone is probably the only species that yields Vanilla. *V. claviculata*, Tendril-Bearing Vanilla, is a native of the Antilles in woods, and in the mountainous inland parts of Jamaica. The stem climbs to the height of 20 or 30 feet, and appears as if jointed at the insertion of each leaf, from a slight swelling. *V. grandiflora*, Large-Flowered Vanilla, is a native of French Guiana, and, Lindley supposes, may produce some of the Vanilla of commerce. *V. planifolia*, the Fragrant Vanilla, is a native of Mexico and several parts of South America, and is also stated by Royle to be an inhabitant of the East Indies. It was introduced into this country in 1800. As it very rarely flowered, and never produced fruit in Europe, it was never suspected to be the plant that yielded the Vanilla of commerce; but M. Morren, of Liège, has succeeded in obtaining abundance of fruit from this plant; and from their character there is little doubt that they are the same as those brought from America.

The fruit is the only part of the plant that is used. It has a balsamic odour, and a warm agreeable flavour. For these properties it is indebted to a peculiar volatile oil, and to a considerable quantity of benzoic acid. The fruit is gathered when it gets yellow, and it is first allowed to ferment for two or three days: it is then laid in the sun to dry, and when about half dried it is rubbed over with the oil of cocoa: it is again exposed to the sun to dry, and oiled again a second time. The fruit is then collected in small bundles, and wrapped up in the leaves of the Indian reed. Neither in Guiana nor in Mexico is the vanilla-plant cultivated, but the fruit is collected by the natives, who sell it to the Europeans.

VANILLA'CEÆ, a natural order of plants, belonging to Lindley's Gynandrous group of Endogens.

VANISH (Mathematics). A quantity is said to vanish, or to become evanescent, when its arithmetical value is nothing, or denoted by 0.

VANLOO, JEAN BAPTISTE, was born at Aix in Provence, in 1684. His grandfather Jacques was a clever portrait painter, and his father Louis Vanloo excelled in design and was a good fresco painter. He was educated in Paris in the French Academy, but settled at Aix in Provence in 1683.

Although much occupied with portraits, in which branch he received the highest patronage, he applied himself to historical pieces. In 1731 he was made a member of the Academy, and in 1735 he was appointed professor. He painted a picture of Diana and Endymion for his reception into the Academy. Notwithstanding Vanloo's great success, a large family and an unsuccessful speculation rendered constant exertion necessary. He came, in 1738, with two of his sons to London, and met with great success. He retired to Provence in Oct., 1742, and died there in April, 1746.

Vanloo had five sons, one of whom, Louis Michel, became painter to Philip V., king of Spain; and another, Charles Amadée Philippe, painter to Frederic the Great of Prussia.

VANLOO, CHARLES ANDRÉ, the son of Louis, and younger brother of Jean Baptiste Van-

loo, was born at Nice in 1705. He learned painting and sculpture when a boy at Rome, and accompanied his brother to Paris in 1719, where he commenced his career as a decorative painter in the Opera-house, but forsook this branch for portrait painting. After he had distinguished himself in various ways, the French king gave him a pension; and in 1729 he was honoured with the title of Cavaliere by the pope.

Besides visiting Rome, he stayed some time at Turin, where he painted eleven pictures from Tasso's 'Jerusalem Delivered,' for the king of Sardinia. In 1735 Vanloo was admitted a member of the Academy; he painted as his reception picture Marsyas flayed by Apollo, which is one of his best works. In 1751 he was made director of the Academy: in 1762 he was appointed principal painter to the king. He died in Paris in 1765.

VANMANDER, CAREL, or CHARLES, was born at Meulebeke near Courtray, in 1548. He showed great ability for both poetry and painting when very young, and having studied those arts under competent masters, set out to gain further knowledge by travel, and visited Italy, Switzerland, and Germany. He ultimately (1583) settled at Haarlem, where he had many scholars; here also he accomplished many literary labours. He wrote songs; translated the 'Iliad;' the 'Bucolics' and 'Georgics' of Virgil; and Ovid's 'Metamorphoses;' and compiled also the greater part of his 'Lives of the Painters,' which he finished in 1604. In the same year he removed to Amsterdam, where he died in 1606. Vanmander painted a considerable number of pictures on religious subjects, many of which have been engraved. He was a good landscape painter, both in fresco and in oil. His son, Charles Vanmander, born at Delft in 1580, was painter to Christian IV., king of Denmark. He had a free touch, and coloured well. He was still living in 1665.

VANNES. [Morbihan.]

VANNI, FRANCESCO, was born at Siena, in 1565, of a family long distinguished in painting. He was first instructed by his father. He finished his studies at Rome with Giovanni de' Vecchi. He ultimately adopted the style of Baroccio. Clement VIII. invited him to Rome, and was so pleased with his picture of Simon Magus rebuked by Peter, that he created him Cavaliere of the order of Christ. This picture is still in good preservation, and is one of Vanni's best works, of which there are several others in Rome. He was also a skilful architect. He died at Siena in 1609.

VAN OOST, JACOB, the Elder, was born at Bruges in 1600. He distinguished himself when very young, and having visited Rome, where he followed the style of Annibal Carracci, he returned in 1630 to Bruges with the reputation of a great painter. In 1633 he was elected dean of the corporation of painters of Bruges. There are many of his works at Bruges. He died in 1691.

VAN OOST, JACOB, the Younger, son of the elder Van Oost, was born at Bruges in 1637. He was first instructed by his father, then studied two years in Paris, and afterwards spent some time in Rome. He ultimately established himself at Lille, where he remained forty years. He returned to his native place in 1713, the year of his death. The younger Van Oost was an able painter in history and in portrait, but his historical pieces are not numerous.

VAN OS, PIETER GERARD, was the son of Jan Van Os, a clever flower-painter, who was born in 1744, and died at the Hague in 1808.

Pieter Van Os was born at the Hague in 1776, and was taught painting by his father. He elected Paul Potter as his model, and copied his pictures assiduously, and some of the works of Charles Dujardin. For a time, owing to the disturbed state of society towards the end of the 18th century, which was very unfavourable to the arts, Van Os was forced to give up his favourite pursuit of animal painting, and to take to portrait painting in miniature and to teaching drawing. After a few years however he again commenced painting landscapes, with cattle, sheep, &c., by which he acquired a great reputation. He died in the Hague in 1839.

The pictures of Van Os are numerous, and are sold at high prices: many of them have been engraved. He himself also etched many plates of cattle, &c., in a masterly manner from his own designs, and from the pictures of eminent painters, Potter, Berghem, Ruysdael, and others.

VANSOMER, PAUL, was born at Antwerp about 1576. He was instructed by his brother Bernard, a good painter of conversation pieces and portraits. Paul came to England about 1606, and met with great success. There is a portrait of James I. at Windsor, and another at Hampton Court, painted in 1615; and he has left portraits of many of the principal personages of that time. Vansomer died in London, and was buried in St.-Martin's-in-the-Fields, Jan. 5, 1621.

VAN SWIETEN. [Swieten.]

VANUCCHI. [Sarto, Del.]

VANUDEN, LUCAS, born at Antwerp in 1595, was instructed by his father, who was a landscape painter; but he made nature his principal study. Rubens employed him to paint skies and landscapes in many of his pictures, and himself inserted figures in the pictures of Vanuden, who however was a good figure-painter.

Vanuden's paintings are distinguished for their lightness of touch, clearness and truth of colouring, and for pure skies and light easy foliage. The date of his death is not known, but he died after 1662.

VAN UTRECHT, ADRIAN, was born at Antwerp in 1599. He painted fruit, flowers, shell-fish, dead game, birds, &c. The best of his pictures are very scarce. He excelled in birds of all descriptions. He died at Antwerp in 1651. With the exception of Snyders, Van Utrecht was superior to all other painters in his line.

VAN VEEN, or VAE'NIUS, OTHO, was born at Leyden in 1550, according to Houbraken, or 1556, according to De Piles and others; Vanmander says he was 47 in 1604. His father was burgomaster of Leyden. Van Veen was taught drawing by Isaac Claes or Nicolas, and painting by Jost Van Wingen. He afterwards travelled, and in Rome studied with Federigo Zucchero. He settled at Brussels, in the service of the Duke

of Parma, and after his patron's death removed to Antwerp, established an academy there, and painted many pictures for its churches. The Archduke Albert of Austria afterwards appointed him master of the mint at Brussels.

Van Veen died at Brussels in 1634, or, according to Houbraken, in 1629. He left two daughters, Gertrude and Cornelia, who both distinguished themselves in painting.

There are several paintings by Van Veen at Antwerp; and in the cathedral of Leyden there is a Supper of the Lord, which is considered a good work; he excelled in invention and in chiaroscuro. His designs are very numerous.

VANVITELLI, LUIGI, was of Flemish origin, but was born at Naples in 1700, and began while a child to display a strong aptitude for art, in which he was instructed by his father, a painter of landscapes and architectural subjects, who died in 1736. At the age of twenty, Luigi was employed by Cardinal Acquaviva to paint some frescoes in the chapel of St. Cecilia, and on other works. He afterwards studied architecture under Filippo Ivara. His first architectural work was the restoration of the Palazzo Albani at Urbino, for the Cardinal di San Clemente; besides which he erected two churches in that city, San Francesco and San Domenico, works that led to his obtaining the appointment of architect to St. Peter's at the age of twenty-six. At Rome his most important work was the convent of San Agostino; but he was also employed in various cities of Italy. The principal work of Vanvitelli was the immense palace at Caserta, built for the King of Naples, of which the first stone was laid Jan. 28, 1752. Vanvitelli published a large folio volume of the plans, &c., in 1757, under the title of 'Dichiarazione de' Disegni del Reale Palazzo di Caserta.' He died March 1, 1773.

VAPOUR consists of ponderable matter combined with sufficient specific heat to enable it to retain its aëriform existence. The difference between vapour and gas is one of degree only: for when atmospheric air containing, as it always does, the vapour of water, is suddenly cooled by exposure to a colder substance, the water which it contained in the state of invisible vapour is deposited in the state of palpable water on the colder body; and many gaseous bodies which were once considered as permanently elastic have been shown by the important investigations of Dr. Faraday to be reducible to liquids. [EVAPORATION.]

VAR, a department in France, formed out of a portion of Lower Provence, and named from its chief river, is bounded N. by the department of Basses-Alpes, N.E. by Piedmont, S. and S.E. by the Mediterranean; and W. by the department of Bouches-du-Rhône. Its greatest length from N.E. to S.W. is 83 miles; its greatest breadth is 63 miles. The area is 2806.5 square miles, and the population is 349,859, which gives 124.66 to the square mile, being 49.09 below the average per square mile for the whole of France.

The coast of this department is rocky, indented by several bays, and skirted by numerous islands. The principal bays are those of Antibes, Fréjus, Hyères, and, W. of the peninsula of Giens, those of Giens and Toulon. Of the islands, several of which are fortified, the most important are the Hyères group and the isle of Sainte-Marguerite, opposite Cannes. Some of the bays present a low sandy shore.

The department is mountainous. A branch of the Alps extends from E. to W. through the department, forming the watershed between the Durance and the Mediterranean. Another range parallel to the above extends along the coast between Hyères and Fréjus, separating the coast from the valley of the Argens, which river, after draining the valley in its eastern course, turns S.E. and flows past the eastern extremity of the range into the Mediterranean near Fréjus. The highest point in the department is the summit of La-Sainte-Baume on the borders of Bouches-du-Rhône, which is 3285 feet above the sea. The mountains along the coast contain granite and clay slate; the range N. of the valley of the Argens is chiefly calcareous: but in both ranges hills are met with containing sand, gravel, fossil shells, carboniferous deposits, and volcanic products.

Among the minerals of the department are—iron, lead, manganese, coal, lignite, marble of various colours, alabaster, porphyry, granite, serpentine, jasper, and gypsum. There are salt-works on the coast, especially at Hyères.

The rivers are small, and not navigable. The Gapou or Gapeau in the western part of the department, the Argens in the centre, and the Siagne and Loup in the eastern part, flow into the Mediterranean, and with their several tributaries, belong wholly to this department. The Var, which belongs chiefly to the Sardinian territory, and its tributary the Esteron, form the north-eastern boundary of the department; and the Verdon, which flows into the Durance, forms in one part the northern boundary. The Durance itself just touches the north-west corner. Lagunes of considerable extent are found near the coast, the chief of which are those of Pesquier in the isthmus of Giens, and those of Napoule and Villepoy, near the eastern boundary. Roadway accommodation is afforded by 6 national, 22 departmental, and 14 parish roads.

The climate of the department is, for the latitude, temperate: the winters are mild except when 'the mistral' blows. The south-east wind is very relaxing.

The soil is by no means favourable, taken as a whole, however fertile particular spots may be; and from the hilly nature of the country, cultivation is carried on chiefly by manual labour. The corn grown does not suffice for more than two-thirds of the consumption. The meadows do not amount to more than about 20,000 acres; but there is a considerable extent of open pasture: in summer however the grass is so scorched up that the sheep, which are numerous, are sent at that season to feed in the mountain pastures of the department of Basses-Alpes. Goats, mules, asses, and pigs, are numerous. The vine and the olive are cultivated in terraces on the slopes of the hills. The vineyards cover about 170,000 acres, and yield 17,600,000 gallons of white, red, and

good muscatel wine annually. The pomegranate, the citron, the orange, the almond, and the fig, grow in the open air; the plum and the peach are grown and preserved for exportation; and the caper and the jujube are cultivated. The mulberry is extensively grown; silk and tobacco are raised in considerable quantities. The woodlands, which cover about 570,000 acres, yield firs equal to those of the north of Europe, cork-trees, and the kermès oak. Odoriferous plants, the rose, jasmine, heliotrope, &c., are cultivated for making essences and perfumes, especially about Grasse. Game is abundant, and a great number of bees are kept, which produce exquisite honey.

The tunny, anchovy, and sardine fisheries are actively carried on along the coast. The industrial products are—coarse woollen cloth, perfumery, liqueurs, confectionary, olive-oil, soap, corks, leather, brandy, silk twist, paper, glass, pottery, and salt of lead.

The department is divided into 4 arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Draguignan .	11	60	86,998
Brignoles . .	8	54	68,857
Grasse . . .	8	60	66,150
Toulon . . .	8	28	127,854
Total . .	35	202	349,859

Of the arrondissement of Draguignan and of the whole department the capital is DRAGUIGNAN. *Aups*, a small but ancient town, 15 miles N.W. of Draguignan, stands in a plain at the foot of the northern range of mountains, and has 2827 inhabitants. There are ancient ruins near this place, and several Roman milestones are found in the canton of Aups. *Callas*, 5 miles N.E. from Draguignan, has coal mines, and 2125 inhabitants. *Fayence*, an ill-built town E. of Callas, stands on high ground, and has a population of 2263, who manufacture oil, leather, pottery, and glass; the church of Notre-Dame in this town dates from the 12th century. *Fréjus*, the ancient *Forum Julii*, situated on an eminence about a mile from the sea, and the same distance from the mouth of the Argens, is 14 miles S.E. from Draguignan, and has a population of 3062. The town was a place of importance under the Romans, who greatly embellished it, as the remains of an aqueduct, an amphitheatre, and other buildings, testify. The ancient harbour, which was sunk under the walls of the town, communicated with the sea by a canal; a mass of water brought by a cut from the Argens kept the harbour and its approaches clear of mud. This cut was neglected in after times; the harbour and canal were converted into a marsh, which has been recently drained, and corn now grows where the Roman galleys once rode at anchor. Fréjus gives title to a bishop. The former episcopal residence, the cathedral, the theological college, and the new hospital, are the principal buildings. At the little fishing harbour of *St.-Raphaël*, Napoleon landed from Egypt, Oct. 9, 1799; and here also he embarked for Elba in 1814. *Lorgues*, 7 miles S.W. from Draguignan, near the left bank of the Argens, and traversed by the high road to Aix, has a handsome church, woollen-cloth factories, oil and corn mills, tanyards, brick and tile works, brandy distilleries, marble quarries, and 4196 inhabitants. *Le-Luc*, S.W. of Lorgues, has a population of 3441, who manufacture woollen stuffs, corks, oil, brandy, leather, and glass, and trade also in large chestnuts, the produce of the neighbouring woods. *Salernes*, 13 miles W. from Draguignan, on the left bank of the Bresque, a feeder of the Argens, in a fertile and picturesque country, has 2544 inhabitants, who manufacture coarse woollens, pottery, and oil, and trade in wine, figs, silk, cattle, &c. *St.-Tropez*, a small seaport town, 22 miles S. by E. from Draguignan, is built in a pretty situation on the shore of the bay of Grimaud, and has a school of hydrography, and 3538 inhabitants, who are engaged in the coast fisheries, in ship-building, and the coasting trade. The harbour is well sheltered, and affords safe anchorage.

The arrondissement of Brignoles takes its name from its chief town *Brignoles*, which is situated on the Calami, in a fertile basin, shut in by wooded hills, 25 miles W. by S. from Draguignan, and has tribunals of first instance and of commerce, and 5518 inhabitants. The town is pretty well built, and contains several squares, planted with trees, and adorned with fountains. Woollen cloths, soap, glue, wax candles, spun silk, pottery, leather, and brandy, are the chief industrial products; the commerce in these articles, and in wine, liqueurs, olive-oil, oranges, and plums, is considerable. *Barjols*, a town of 3132 inhabitants, is situated on the slope of a hill, in a beautiful district, 12 miles N. from Brignoles, and has manufactures of paper, leather, pottery, brandy, and confectionary. *Cotignac*, built at the foot of a hill, 8 miles N.N.E. from Brignoles, has a public library of 4000 volumes, silk mills, tanyards, some trade in wine, raw silk, figs, and confectionary, for which it is famous; the population amounts to 3557. *St.-Maximin*, situated in a fine plain, near the source of the Argens, 10 miles W. by N. from Brignoles, is girt with walls, and has 6385 inhabitants, who manufacture woollen and cotton stuffs, and brandy. The church, built in this town by Charles II. of Naples and Count of Provence about 1283, is one of the finest religious structures in the department; the wood carvings of the choir and the pulpit are considered to be masterpieces of art.

Of the arrondissement of Grasse the chief town, *Grasse*, situated on the slope of a high hill, 23 miles E. from Draguignan, has tribunals of first instance and of commerce, a college, an ecclesiastical school, and 11,381 inhabitants, who manufacture coarse woollens, silk, liqueurs, olive-oil, soap, leather, and a great quantity of essences and perfumes, particularly those made from orange flowers, roses, mint, &c. The houses of the town are well built; but the streets are steep, crooked, and narrow. In the highest part of the town there is an abundant spring, which supplies water

to two public washhouses, and drives the machinery of several mills; after performing these services the water is conducted by canals to irrigate the environs of the town, which abound in flower gardens. The principal church, a heavy gothic building; the great market-place; the hospital; the public library, which contains 5700 volumes; the theatre; and several pretty public walks, are the most note-worthy objects in Grasse. *Antibes*, a small seaport and fortress on the Mediterranean, near the confines of Piedmont, 12 miles S.E. from Grasse, has a school of hydrography, a tribunal of commerce, and 6880 inhabitants, who are engaged chiefly in the fisheries and the coasting trade; the principal articles of their commerce being salt-fish, wine, olive-oil, oranges, figs, and other dried fruits. The harbour is small but deep, defended by a square fort built on a rock, and formed by a long semicircular jetty, which terminates in a lighthouse, and is bordered by a quay and a range of arcades. The parish church, two high towers, built it is said long before the Christian æra, and the town-hall, are the most remarkable buildings. *Cannes*, a small town of 3881 inhabitants, situated on the slope of a hill above the shore of the Mediterranean, 8 miles S. from Grasse, is pretty well built, and has a large quay, but vessels cannot come close to shore. The vicinity of Cannes presents many beautiful sites in which the orange and citron flourish; the climate is delicious. *Vence*, an ill-built walled town, with pretty suburbs, is situated 12 miles N.E. from Grasse, in a well-cultivated district and a most delightful climate; it occupies an ancient site, as is proved by its old ruins with inscriptions, and has 3165 inhabitants, who manufacture leather and oil.

Of the arrondissement of Toulon, the chief town is Toulon. *Le-Beausset*, 10 miles N.W. from Toulon, has a population of 2772. *Cuers*, 13 miles N.E. from Toulon, built at the foot of a hill, covered with vineyards, olive groves, and fruit trees, has 4309 inhabitants, chiefly engaged in agriculture. Hyeres. *Ollioules*, 5 miles from Toulon, on the road to Le-Beausset, prettily situated at the north-western extremity of a savage and rocky gorge, called Vaux-d'Ollioules, and traversed by the high road, has a population of 3012, who raise vast quantities of fruits. *Solliès-Pont*, 7 miles N.E. from Toulon, on the Gapeau, is a pretty village, with a handsome church, silk mills, tanyards, and 3171 inhabitants, who trade in figs, oranges, citrons, &c.

The department forms the see of the bishop of Fréjus; it is included in the jurisdiction of the High Court of Aix, and belongs to the 7th Military Division, of which Marseille is headquarters. Under the late monarchy it returned 5 members to the Chamber of Deputies; it now has 7 representatives in the Legislative Assembly of the Republic.

(*Dictionnaire de la France; Annuaire pour l'An* 1851; *Annuaire du Commerce pour* 1850.)

VARADES. [Loire-Inférieure.]

VARA'NIDÆ, a family of Lizards belonging to the Platynote or Broad-Backed Saurians of MM. Duméril and Bibron. These large lizards are divided by the authors above-named into two genera, *Varanus* and *Heloderma*.

Next to the Crocodilians, the Varanians attain the greatest size of any of the Saurians.

The Varanians are divisible into two distinct groups: the eminently *terrestrial group*, whose abode is far from the waters, in desert and sandy places; and the *aquatic group*, consisting of those which inhabit the banks of rivers and lakes.

The first have the tail entirely conical and nearly rounded, and it would appear at first sight to be useless, if not in the animal's way: but as Nature makes nothing in vain, Wagler's notion that it acts as a necessary counterpoise to the trunk is probably, so far as it goes, correct. The multitudinous bones which form the tail of the second are very well developed, particularly in their transverse processes, and offer strong points of attachment for the muscles: the upper and lower apophyses are comparatively greatly increased. Compressed throughout its entire length, this tail becomes a powerful organ of motion when the animal is in the water, particularly as it is often surmounted with a crest formed by one or two rows of flattened scales, a fit propelling oar for the body rendered buoyant by the air with which the lungs are filled.

On land the Varanians run with rapidity, but their motion is always serpentine, a mode of progression due to their long tail, which helps to push them forward, and aids them in their leaps upon the prey which they pursue.

The food of the Varanians consists of animal matters, and especially large insects, such as *Blattæ*, locusts, crickets, and beetles. It is asserted that they hunt after the eggs of birds and crocodiles, and that chameleons, small tortoises, and fish, have been found in their stomachs.

Geographical Distribution.—The family of Varanians, as modified by MM. Duméril and Bibron, exists in all parts of the world, with the exception of Europe. America claims one only, that on which the genus *Heloderma* is founded. In Asia there are four *Varani* properly so called: four in Africa; and four in Oceania. Of these last four, two have been observed in Australia, one in the isles of the Papuans, and the fourth in the isle of Timor.

Terrestrial Varanians.

MM. Duméril and Bibron notice but two terrestrial species, the *Terrestrial Monitor* of Egypt, *Varanus arenarius* (Dum. and Bib.), and *Varanus Timoriensis* of the same authors. But Dr. Smith has since given a very accurate figure and description of *Varanus albogularis*, the species whose locality was unknown to MM. Duméril and Bibron; and the form of the tail, &c., together with Dr. Smith's account of its habits, leaves little doubt that it ought to come in this section.

Dr. Smith did not obtain any specimens of *V. albogularis* south of Latakoo, but there is, he says, reason to believe that it occasionally occurs within the limits of the Cape Colony; and he adds that it is in all probability the animal which is called *das Adder* by the colonists, and which is so much dreaded from the supposition that it is extremely venomous. 'It is usually,' continues

Dr. Smith, 'discovered in rocky precipices, or on low stony hills, and when surprised seeks concealment in the chinks of the former, or in the irregular cavities of the latter; and when any irregularities exist upon the surface of the rocks or stones, it clasps them so firmly with its toes, that it becomes a task of no small difficulty to dislodge it, even though it can be easily reached. Under such circumstances the strength of no one man is able to withdraw a full-grown individual; and I have seen two persons required to pull a specimen out of a position it had attained, even with the assistance of a rope fixed in front of its hinder legs. The moment it was dislodged it flew with fury at its enemies, who by flight only saved themselves from being bitten. After it was killed it was discovered that the points of all the nails had been broken previously, or at the moment it lost its hold. It feeds upon frogs, crabs, and small quadrupeds; and from its partiality to the two former, it is often found among rocks near to springs or running streams; which fact having been observed by the natives, has led them to regard it as sacred, and not to be injured without danger of drought.' ('Illustrations of the Zoology of South Africa.')

Aquatic Varanians.

The Monitor of the Nile, *Varanus Niloticus*, is noticed under MONITOR. Another species, *Varanus Bellii*, is a native of Australia.

Heloderma.

Generic Character.—Scales or tubercles of the body simple or not surrounded with small squamous grains. Tail rounded. The fifth toe of the posterior feet inserted on the same line with the other four. (Dum. and Bibr.)

The Heloderms have not the scales or tubercles with which they are covered surrounded by small squamous grains like the Varans. The five toes of each of the posterior feet of the *Helodermata* are inserted on the same transversal line, whereas in the *Varani* the fifth is attached to the tarsus, farther back than the others. The teeth differ too from those of the Varans, for they are not compressed. The tail of the Heloderms is rounded throughout its extent.

Example.—*Heloderma horridum*. Locality, Mexico, where there is an erroneous but general belief that the bite of this species is fatal.

From the *Varanians*, we may pass to a brief account of the *Lacertidæ*, or True Lizards.

The *Lacertinidæ*, in Mr. J. E. Gray's arrangement, come immediately after the *Teidæ*, and are followed by the *Zonurdiæ*.

Mr. Gray's *Lacertinidæ* consist of the genera *Zootoca, Lacerta, Teira, Eremias, Acanthodactylus, Scapteira, Meroles, Mesulina, Calrita, Algira, Psammodromus, Ophiops*, and *Calosaura*.

We must here confine ourselves to the genera *Lacerta* and *Zootoca* as examples.

Lacerta, Linn.

Generic Character.—Throat with a distinct collar. Nostrils situated towards the outer and inferior margin of the nasal scuta. An osseous superorbital lamina. Temples covered with scuta. Scales of the back, orbiculo-polygonal, slightly carinated. Palate toothed. (Bell.)

Example.—*Lacerta agilis.*

Great confusion has existed touching the identity of this beautiful English species, arising from the application of the term *agilis* by naturalists to the common lizard of their several countries. This has not escaped the acute observation of the Prince of Canino and Musignano, who, in his 'Fauna Italica' clearly defined the true *Lacerta agilis*, or *Lacerta di Linneo*. Mr. Bell, in his elegant work on 'British Reptiles,' follows out the inquiry with great learning and industry, and we shall take our descriptions from his work.

Mr. Bell describes the *Lacerta agilis* as varying exceedingly in colour and marking. The most common colour of the upper parts is a sandy-brown, with obscure longitudinal fasciæ of a darker brown, and a lateral series of black rounded spots, each marked with a yellowish white dot or line in the centre. There is often in this most common variety more or less of green on the sides. Length from 7 to 8 inches.

Another variety has the upper parts more or less of a green hue. In some this colour is brighter and lighter than in others, but the usual colour is a rather dull brownish-green. The beautiful green *Lacertæ* seen by Gilbert White on the sunny banks near Farnham, were probably of this variety. The Prince of Musignano, in his 'Fauna Italica,' figures a variety with the whole of the back of a dull black-red colour. The under side is usually of a whitish or grayish colour, varied with light green towards the sides, about the collar, and under the tail, and a few black dots scattered about those parts.

Locality.—North of Europe, as high as Sweden and Denmark; rare so far south as Italy. Common in the north of France and Central Europe. In England, near Poole.

Habits.—Mr. Bell states that the *L. agilis* is far less easily rendered familar than the beautiful green lizard (*L. viridis*) of Guernsey and the south of Europe. 'This latter species,' says Mr. Bell, 'may be readily tamed, and taught to come to the hand for its food, and to drink from the hollow of the palm of any one to whom it is accustomed. It will lie coiled up between the two hands, enjoying the warmth, and not offering to escape. But it is very different with the present species, which appears not to be susceptible of any such attachment. It will indeed attempt to bite any one who handles it, which I have never known to occur with the *L. viridis*. When in confinement it ceases to feed, conceals itself with extreme timidity when approached, and ultimately pines and dies.'

The number of eggs laid by the female is from twelve to fourteen, in hollows excavated by her for a nest. She covers them with sand, and leaves them to the rays of the sun. Mr. Bell is of opinion that the eggs are deposited a long time before they are hatched. He does not think that this species ever brings forth its young alive.

Zootoca, Wagl.

Generic Character.—Nostrils, collar, superorbital lamina, as in the genus *Lacerta*. Temples covered with adpressed scales. Scales of the back elongated and hexagonal. Palate toothless. (Bell.)

Example.—*Zootoca vivipara.* Smaller and more slender than *L. agilis.* Common on our sunny banks and hedgerows. This species, as Mr. Bibron assures us, is abundant in France, Italy, Germany, Switzerland, and Russia. It is one of the few reptiles found in Ireland. 'Its movements are beautiful, gracile, as well as rapid: it comes out of its hiding-place during the warm parts of the day, from the early spring till autumn has far advanced, basking in the sun, turning its head with a sudden motion the instant that an insect comes within its view, and, darting like lightning upon its prey, it seizes it with its little sharp teeth and speedily swallows it. Thus it will often take a great number of the smaller insects, preferring those of the dipterous order, though it will not refuse many of the coleoptera or orthoptera, if they be not too large.

'Instead of depositing her eggs in the sand to be hatched by the warmth of the sun, as is the case with the former, the female of the present species retains the eggs within the oviduct until the young are ready to leave them, and they are produced alive. As in all the ovo-viviparous reptiles, the covering of the egg is very thin, and merely membranous. In this respect they differ from those which deposit their eggs before the embryo is formed. In the latter case a more efficient protection is necessary, and the covering is either calcareous, as in the tortoises and crocodiles, or of a substance resembling parchment, as those of the snakes and most lizards. In the viper, which also produces its young alive, the covering, as in the present animal, is extremely thin, and very easily torn; and there is reason to believe that the laceration of this membrane and the emancipation of the young take place in, and are occasioned by, the very act of parturition.

'As the young ones are occasionally found with the mother, there is some reason to believe that these little animals are not wholly devoid of the instinct of parental care and tendance; but it is scarcely probable that the exercise of this feeling is ever very powerful, or that it endures for any considerable period. The young when brought forth are fully formed, and capable of running about, and very shortly afterwards of taking their own food. The usual number is from three to six.'

VARCHI, BENEDETTO, born at Florence in 1502, was intended for the law, but gave up that profession for literature. At the time of the fall of the Florentine republic, Varchi emigrated to Padua and Bologna. Some years after Cosmo I. recalled Varchi, and appointed him one of the directors of the new Florentine Academy. The academy brought forth the 'Ercolano' (a disquisition on language) of Varchi, who, in order to uphold the Tuscan language, also published translations of Seneca, 'De Beneficiis,' and of Boethius, 'De Consolatione.' He wrote commentaries on Dante and Petrarch, and also sonnets and other short poems. But the principal production of Varchi is the 'Storia Fiorentina,' from the year 1527 to 1538. This work was not published for a long time after his death; yet parts of it became known in his lifetime, and drew upon him the vengeance of powerful persons. One night he was attacked and stabbed in several parts of his body. Duke Cosmo endeavoured to compensate him for his injuries by making him a gift of his pretty country-seat called 'La Topaja,' and of the clerical benefice of Montevarchi. Pope Paul III. invited him to Rome, but Varchi declined the offer. He died in 1565.

VARENNES-EN-ARGONNE. [MEUSE.]

VARESE. [COMO.]

VARGAS, LUIS DE, was born at Seville in 1502. In 1527 he went to Rome, and is said to have become a scholar of Perino del Vaga. Vargas remained twenty-eight years in Italy. His principal works, which are all religious, are at Seville,—in the Cathedral; in the Hospital de Santa Marta; in Santa Cruz; in Santa Maria la Blanca; in the Merced Calzada; in the Hospital de la Sangre; and in the Casa de la Misericordia. He died in 1568. He was the first who established a correct and grand style of design in oil and fresco in Andalucia.

VARIATION OF THE COMPASS (or of THE NEEDLE), frequently called the Declination of the Needle, is the angle which a vertical plane passing through the axis of a magnetised needle makes with the geographical meridian of a ship or station; and as, for the purposes of navigation, the needle is made to traverse horizontally, the variation becomes the angle between the magnetic axis of the needle and a meridian line passing parallel to the horizon through the centre of the compass.

When the variation of the needle was first distinctly ascertained in London, by Norman and Burroughs, in the year 1580, it was found that the magnetic axis deviated from a true meridian line as much as 11° 15′, its north point being directed so far towards the east; and in a few years from that time it was discovered that the angle of deviation was slowly diminishing. In the year 1657 the needle appeared to lie in the direction of the geographical meridian of London; and from that time to the year 1820 the northern extremity of the needle continued to advance towards the west. A mean of the observations between the years 1814 and 1820 shows that the deviation was then about 24° 18′; and at present, in London, it appears to be diminishing, the observations made since 1838 indicating a variation amounting to less than 24°. Like deviations of the magnetised needle have been observed in other parts of the world.

VARICELLA, or *Varicella Lymphatica*, is the eruptive disease commonly called Chicken-Pox, and which has been described by different writers under the names of crystalli, variolæ pusillæ, variolæ spuria, &c. It is almost peculiar to infants and young children; and the eruption appears either without premonitory signs, or after two or three days of slight illness. The eruption commences on the shoulders, neck, and breast: on the scalp and back it is usually abundant, but the face is only slightly affected. It consists of vesicles, about as large as a split pea, full of transparent fluid, and lenticular, conoid, or globular in their form. They are surrounded by a slight

superficial redness, and successive crops of them appear for two or three days, the old vesicles shrivelling up as the new ones are formed. Most of the vesicles burst naturally, and the cuticle which covered them falls to the level of the surrounding skin; but some shrink, the fluid within them becoming whey-like, or, if they be much irritated, purulent. After drying they form small scabs which fall off in grains, and sometimes leave small superficial scars. The whole course of the disease occupies about a week, and is not attended by any important constitutional disturbance. It therefore requires no particular treatment.

VARICOSE VEINS. [VEINS, DISEASES OF.]

VARIETIES, in Botany, are groups of individual plants subordinate to species. The character of the species is found in its capability of reproducing by seed a plant which is more like itself than it is like anything else; and this under all circumstances in which the offspring is capable of being produced. The variety differs from the species in points of structure which are developed only under certain circumstances, and which are not essential to the species. This may be illustrated by an example—as for instance, the Common Apple (*Pyrus Malus*). If the seeds of the wild apple, or any of the cultivated varieties of apples, are sown under any circumstances, the plants that spring from these seeds will, in the great mass of their characters, be more like all other apple-trees, than they will be like pear, plum, or any other trees. This then illustrates the idea of a species. If, on the other hand, the seeds of some of the sorts of apples, known under the names of Golden Pippin, Nonpareil, &c., be sown under different circumstances from that in which the plant from which they are taken was grown, the plants produced will differ in many respects from their parent in the characters that constitute the variety, but not in those of the species. The characters on which the definition of a species is founded ought to be such that no circumstances can alter them; whilst the essence of a variety consists in its having characters which are altered and produced by circumstances.

In botanical works considerable difference exists in recording varieties and species, as it is difficult where the history of a plant cannot be traced, to draw a distinction between the permanent character of the species and the variable character of the variety.

The mode of recording varieties differs in different writers. In some cases the species is defined, and the description is regarded as indicating one amongst the groups of varieties of which the species is composed. The Greek alphabet is used frequently alone to express varieties. Thus Hooker, in the 'British Flora,' gives the definition of *Rosa inodora*, and afterwards describes the varieties as β and γ, and they are always spoken of as varieties α, β, and γ of *Rosa inodora*, the character of the species constituting var. α. Many writers give an additional name to the variety which is attached to that of the species. Thus the varieties of *Euphorbia lucida* are written *Euphorbia lucida latifolia*, *E. l. salicifolia*, *E. l. linearifolia*.

Where plants have undergone many changes by cultivation, further subdivisions are frequently resorted to: thus by some writers *Brassica Rapa*, the Common Turnip, is described in two subspecies, *B. R. oleifera* and *B. R. rapifera*; each of these has several varieties, as *B. R. o. biennis*, and *B. R. o. annua*, and *B. R. r. longa*, and *B. R. r. rotunda*. Each of these varieties has again been subdivided, according to the colour of the roots, forming white, yellow, green, and red subvarieties.

The natural varieties of plants are nothing like so numerous as those which arise from cultivation. Almost the entire object in view in the kitchen and fruit gardens is the developing of some property in plants which they do not exhibit in their natural state, and this is mostly attended with a corresponding change of structure. All the varieties of apples are produced by cultivation from the Common Crab (*Pyrus Malus*), all the pears from *Pyrus communis*; the cherries from *Prunus Cerasus*; peaches, apricots, and nectarines, from *Amygdalus Persica*; and plums from the *Prunus domestica*. The same is true of vegetables: all the varieties of cabbages are produced by cultivation from the same species; so also with turnips, potatoes, radishes, &c. This is also the case with flowers: the great majority of tulips, roses, anemones, ranunculi, &c., found in gardens are the result of changed characters dependent on cultivation.

VARIGNON, PIERRE, was born at Caen in 1654. His father, an architect, destined him for the church, and placed him at the college of his native town. He learned to make a sun-dial as well as his father's workmen could teach him, and this gave him a longing to know the principles on which such things are done, which he never found the way to gratify until, by accident, he met with a Euclid in a bookseller's shop. From this he went on to the writings of Descartes, much against the wishes of his friends, and became well versed in the mathematics of the day. Among his college friends was the Abbé de St. Pierre (not Bernardin, the author of the 'Studies of Nature,' but Charles), whose regard for Varignon induced him to make over to the latter 300 francs a year out of 1800, which was his patrimonial fortune. This was his sole provision for many years, and enabled him to pursue his studies: the two friends went to Paris in 1686, took up their quarters in the same house, and pursued their several researches. It was here that Fontenelle, who was also of Normandy, became acquainted with them, and he describes Varignon as the most laborious of students; glad to go on with what he was doing at two o'clock in the morning, under the pretext of its not being worth while to go to bed, because he usually rose at four. In 1687 his first work, the 'Projet d'une Nouvelle Mécaniqne,' a most remarkable work, being in fact the first in which the great elementary principle of the composition of forces is made the basis of a systematic development of statics, brought him at once into such reputation, that he was in the following year elected to the Academy, and appointed professor of mathematics at the Collège Mazarin: in 1690 appeared the

'Nouvelles Conjectures sur la Pesanteur.' By 1705 he had ruined his health: he was for six months in danger, and for three years in a state of debility. He died Dec. 22, 1722, without illness, having performed his usual duties at the college the day before.

Besides his two separate works, he printed a great deal in the Memoirs of the Academy of Sciences, particularly in defence of the new doctrines of the infinitesimal calculus. His name is familiar to all who have even glanced at the history of this theory as the explainer of its difficulties in answer to the earnest and frequently plausible attacks which were made upon it.

VARI'NAS, or BARI'NAS, the chief town of the province of Barinas, in the republic of Venezuela, lies near 7° 30′ N. lat., 70° 12′ W. long., is built at the base of the Nevado de Mérida, an offshoot of the Andes, and on the north-western edge of the great plain of the basin of the Orinoco. The inhabitants of the mountains bring to the town their corn and fruit, and take in exchange the produce of the numerous herds of cattle which pasture on the plains. The country which surrounds the town is very fertile, and especially fit for the cultivation of tobacco, which forms the staple article of its commerce, and is sent to Europe by way of Angostura. The river St.-Domingo, which rises on the declivities of the Nevado de Mérida and passes through Barínas, becomes navigable at Toruno, about 14 miles below the town; so that Toruno may be considered as the port of Barínas, from which its exports are sent down the St.-Domingo, the Apure, and the Orinoco to Angostura. The population is stated to be about 6000.

VARIOLA. [Small-Pox.]

VARIOLA'RIA, a genus of plants, belonging to the natural order of Lichenes.

V. faginea, the Bitter-Zoned Variolaria, is one of the species included in the *Lichen fagineus* of Linnæus. It is common on the bark of trees, especially of old beech-trees, and on pales. This species is distinguished from all others of the genus, as well as of the order, by its intensely-bitter taste. *V. lactea*, Milky-White Variolaria, is the *Lichen lacteus* of Linnæus. It occurs on rocks in mountainous countries. This is a very elegant species of the genus. *V. globulifera*, Vesicle-Fruited Variolaria, is found only rarely, growing on the bark of old oaks and beech-trees. It was gathered by Dr. Sibthorp in Greece; and, on account of the form of the reproductive organs, is the most remarkable-looking species of the genus. *V. Vitiligo*, Leprous Variolaria, is common on old rails and gate-posts, giving them the appearance of having been imperfectly daubed over with white paint.

VA'RIUS, LU'CIUS, a Roman poet, and a friend and contemporary of Virgil and Horace, both of whom speak of him in high terms. From Donatus's 'Life of Virgil,' it appears that Varius survived Virgil, who died B.C. 19; for Varius is there described as one of the heirs of Virgil, and as one of the poets who undertook the correction of the 'Æneid.' Varius distinguished himself both as an epic and as a tragic poet. Quintilian (x., i. 98) says that his tragedy of Thyestes would bear comparison with any Greek tragedy. His works are lost.

VARLEY, JOHN, was born in London about 1777. His taste led him to art, in which he seems to have received little instruction, and at first but little encouragement. He worked for an obscure portrait painter in Holborn, and in 1799 accompanied Arnold, the landscape painter, on a tour in Wales. He had previously attracted some attention by a view of Peterborough Cathedral, and he now obtained constant employment. Varley gave to his paintings nearly all the vigour of oil-pictures, and by a mode peculiar to himself. He was a member of the 'Water-Colour Society,' and his pictures contributed in no small degree to the attraction of its exhibitions. He devoted much time to the study of judicial astrology, and was in the habit of giving his advice formally to those who consulted him respecting their 'nativities.' He died Nov. 17, 1842.

VARNISH, a fluid applied to the surfaces of various articles, as wood, &c., and which, by the evaporation or chemical change of a portion, leaves upon them a shining coating impervious to air and to moisture.

Varnishes may be divided into three classes, alcoholic or spirit varnishes, volatile-oil varnishes, and fixed-oil varnishes.

Spirit Varnishes are in general prepared very readily, are easily applied, soon become dry, and emit no disagreeable smell: they are, however, liable to crack or scale off, and are incapable of resisting friction or blows. The following are among the most approved spirit varnishes:—Take of mastich 6 ounces, sandarach 3 ounces, reduced to fine powder, and add 4 ounces of coarsely-powdered glass, which prevents the resins from agglomerating into a mass or sticking to the bottom of the vessel; digest in a quart of spirit of wine, contained in a loosely-corked vessel for three days in a warm room, shaking the mixture frequently; then add 3 ounces of melted Venice turpentine to the warm solution, stirring thoroughly till mixed; let the mixture remain in a warm room for about a week and then strain it. This is a strong varnish applied to chairs and other articles of furniture. Take of copal, which has been liquified and afterwards very finely powdered, 3 ounces, mastich 2 ounces, and elemi 1 ounce; digest in a warm room in a quart of spirit, and when the solution is complete, add 2 ounces of Venice turpentine. This is a good varnish for violins and other musical instruments. For different purposes the ingredients of spirit varnishes are considerably varied; seed-lac, benzoin, anime, or frankincense, entering into the composition, according to the use to be made of them.

The only essential or volatile oil largely used in varnishes is oil of turpentine, or, as it is commonly called, spirit of turpentine; and one of the best varnishes into the composition of which it enters is copal varnish. This is chiefly used for pictures. Another powerful varnish is prepared by adding to highly-rectified oil of turpentine about an eighth of its weight of caoutchouc.

In these varnishes the volatile solvents evapo-

rate, but in the case of fixed-oil varnishes, the solvent undergoes a chemical change, and dries with the substance dissolved—these are sometimes termed fat varnishes. Mix 4 ounces of copal, which has been liquefied and finely powdered, oil of turpentine, and drying linseed-oil, each 10 ounces; digest in a gentle heat till the whole is dissolved; strain it after standing a few days. This forms a solid and nearly colourless glazing, and dries easily at common temperatures.

VAROTA'RI, ALESSANDRO, called *Padovanino*, was born at Padua in 1590. His father Dario Varotari was a painter and architect, who died in 1596. Alessandro Varotari went in 1614 to Venice, and devoted himself to the study of Titian. His works are seldom seen out of Venice and Padua. His masterpiece is generally considered the Marriage at Cana, in the Academy of the Fine Arts at Venice. He died in 1650.

VARRO, MARCUS TERE'NTIUS, was born at Rome B.C. 116, and descended from an ancient senatorial family. He was instructed by L. Ælius, who is spoken of as a most distinguished person, and afterwards by Antiochus, an academic philosopher. In B.C. 67 he was at the head of a part of the fleet of Pompeius the Great in his war against the pirates. During the civil war between Cæsar and Pompeius, Varro held the western part of Spain for Pompeius. When his colleagues had been compelled to surrender, Varro also surrendered in the neighbourhood of Córduba, and after being set at liberty he went to Pompeius at Dyrrachium, where he was staying at the time of the battle of Pharsálus. During the absence of Cæsar in Egypt, B.C. 47, M. Antonius destroyed Varro's villa near Casinum, where a great part of his property was lost. After the defeat of Pompeius, Varro withdrew from public life; and when Cæsar came to Rome Varro became reconciled to him, and was intrusted by him with the purchasing of the books for and the whole manage- of the Greek and Latin libraries, which were then established at Rome. After the murder of Cæsar, in B.C. 44, Varro, then a man of upwards of seventy years of age, was put by M. Antonius on the list of the proscribed. His friends concealed and protected him until the danger had passed over, but his libraries were irrecoverably lost. After the battle of Actium, B.C. 30, Varro again lived at Rome, and appears to have been esteemed by Augustus, who gave him the superintendence of the library founded by Asinius Pollio. In his eighty-eighth year he was still writing. (Pliny, 'Hist. Nat.,' xxix. 18.) He died in the 90th (B.C. 27), or, according to Valerius Maximus, in the 100th year of his age.

Varro was the most learned of the Romans, and one of the most learned men that have ever lived. He had seen a great deal of life, and was also a hard student. There was no learning of the age to which he was a stranger. His works were very numerous. Of his work 'De Lingua Latina,' originally in twenty-four books, only six remain, and these are in a mutilated state. It was dedicated to M. Tullius Cicero. If not very valuable as a treatise on the Latin language, it is useful for the remarks which are interspersed. The best edition is by C. O. Müller, Leipzig, 1833, 8vo. The Bipont edition (1788, 2 vols. 8vo.) contains also a collection of the fragments of Varro's lost works.

The work 'De Re Rustica,' in three books, is complete, and the text is in a better state than the treatise 'De Lingua Latina.' Though it was written when Varro was eighty years of age, it is in a pleasing and lively style. Besides treating of agriculture, it contains a great deal of other curious matter. It is printed in the collection of the 'Scriptores Rei Rusticæ,' by J. M. Gessner, and in that of J. G. Schneider.

VASA, GUSTAVUS. [GUSTAVUS ERICKSON.]

VASA'RI, GIO'RGIO, Cavaliere, born at Arezzo in 1512, was a painter and architect, but his reputation now rests nearly exclusively upon his 'Vite de' più excellenti Pittori, Scultori, e Architetti,' first published in Florence in 1550, in 2 vols. 8vo. Many editions of the work have been since published.

The last life in Vasari's work is his own, which he traces up to his 55th year. He was instructed in design by his father Antonio Vasari, and in painting by several masters, including Michel Angelo, at Arezzo, Florence, and Pisa. He entered the service of Cardinal Ippolito de' Medici, who took him to Rome, and introduced him to Clement VII. He returned afterwards to Florence, and there he met with all the success he could desire; but his paintings are remarkable for no particular excellence. Vasari died at Florence in 1574.

VASCULARES, in Botany, is a term applied to the two principal classes of plants, Exogens and Endogens, on account of their highly-developed vascular tissues, in opposition to the class of Acrogens, the tissues of which are principally cellular, and hence they are called Cellulares.

VASES. This word in its widest sense comprises all vessels intended to contain fluids, whether they are made of metal, stone, or clay; but we treat of those only here which have come down to us from remote antiquity, and are remarkable for their qualities as works of art, both in form and in decoration. The most numerous class are those painted vases of dried or baked clay which have of late years been discovered by thousands in Etruria, southern Italy, Sicily, Greece, and some of the Grecian islands. Such vases are frequently found in tombs, catacombs, and other depositories of the dead. The period during which the art of vase-painting completed its development from the rudest elements to the highest perfection, is comprised in the three centuries before the Christian æra, from B.C. 500 to about 200.

Various attempts have been made to classify the immense number of ancient vases, of which specimens are preserved in all the museums of Europe. The most convenient criterion for classifying them is their style of painting, which alone affords a very obvious distinction, and also marks the different stages of the art, though the rule is not infallible, as it is probable that in some cases the most ancient style of vase-painting was imitated at a later period. With this caution we

may divide all painted vases into five great classes:—

1. Vases with paintings in the *Egyptian style.*—This name is not meant to imply that they were made in Egypt or by Egyptians, but merely that their style of painting resembles that on the monuments of Egypt. The characteristics by which vases of this class are easily distinguished are as follows:—The vases are of a pale yellow colour, on which the figures, generally of animals or flowers, are painted in a black or brown colour, sometimes with the addition of purple or white tints. Grace is entirely wanting. Some critics have imagined that some of the vases of this class may be as old as the time of Homer, but the best antiquaries are agreed that most of them are not older than the year B.C. 500. These vases occur most frequently in the tombs of Volci in Etruria, and in those of Nola.

2. Vases with paintings in the *archaic* or *ancient style.*—The vases of this class have black figures on a red ground, and the figures are no longer mere animals and ornaments of the vessels, but contain scenes taken from the stories about the gods and heroes of Greece, and from the occurrences of ordinary life. The form of these vases, which is usually that of the ámphora, has a freedom and elegance of proportions which are wanting in those of the first class; and they vary greatly in size. The peculiarities of the designs are strong outlines of the main parts of the human body, and the expression of the highest degree of physical strength. In the representation of animals, especially horses, there is sometimes a considerable degree of boldness and beauty. The majority of vases of this class are generally believed to have been made previous to the year B.C. 430.

3. Vases with paintings in *the severe style.*—In the vases of this class the figures are red, the natural colour of the clay, on a beautiful black ground. The most striking features in the designs are a certain moderation and harmony. The drapery forms varied and rich folds, though they show a conventional regularity. The heads are worked with great care, and sometimes are truly graceful; the hands and feet are better drawn than on the vases of the former classes. The subjects represented are the same as those on the vases of the second class, but repose is more frequent than action. The forms of the vases are elegant, and they present great variations both in shape and size. They occur most frequently in Etruria and at Nola. Vases of this class are commonly assigned to the period from B.C. 460 to 420.

4. Vases with paintings in *the beautiful style.*—In all the vases which are regarded as the true representatives of this period, all harshness and severity of style have disappeared: liveliness in the composition, perfect freedom in action and movement, as well as in the drapery, are the essential characteristics of this style. The colour of the figures, as in the third class, is the natural red of the clay, and white is used to represent a variety of things, such as ribbons, garlands, the flames of torches, and the like. The inscriptions too are usually painted in white. Vases of this class are not often found in Etruria: they are most frequent in Nola, Sicily, and Attica. The vases of this class which show the highest perfection of the art appear to belong to the period beginning with the year B.C. 400.

5. Vases with paintings in *the rich style.*—These differ but little from the preceding class, and are often difficult to assign with certainty. The designs are frequently executed with considerable carelessness, and show the sinking condition of the art. The best specimens of this class of vases are of extraordinary beauty, but the worst of them are so bad that they can scarcely be regarded as the works of Greeks.

There is a large collection of these vases, including all the classes, in the British Museum; and a number of works have been written on the various curious questions as to their uses, origin, and processes of manufacture. Among the more valuable of these works, we may mention Kramer's 'Ueber den Styl und die Herkunft der bemahlten Griechischen Thöngefässe,' Berlin, 1827, 8vo.

We cannot here enter into a description of the mechanical process of making paintings on vases, which has been the subject of much discussion in modern times, but must refer the reader to an able treatise on this point by Hausmann, 'Commentatio de Confectione Vasorum Antiquorum Fictilium, quæ vulgo Etrusca appellantur,' Göttingen, 1823, 4to.

VASSAL. [FEUDAL SYSTEM.]

VASSY. [MARNE, HAUTE.]

VATER, JOHANN SEVERIN, was born at Altenburg on the 27th of May, 1771. In 1790 he went to the university of Jena, where he studied philosophy and theology. In 1796 he was appointed professor extraordinary in the theological faculty at Jena. In 1800 he was invited to go to Halle as ordinary professor of theology and Oriental literature. After the death of Adelung in 1806, who left his great linguistic work, 'Mithridates,' unfinished, Vater, with the assistance of Adelung's MSS. and of several distinguished scholars, undertook its completion. Adelung had only published one volume, and the other three were published by Vater (Berlin, 1808–17). In 1809 he was appointed professor of theology and librarian in the university of Königsberg, where he continued his linguistic labours. His studies embraced the languages of civilised nations, as well as those of the tribes of America and Africa. In 1820 Vater returned to Halle as professor of theology, and he died there in 1826. The chief object of Vater's studies was a comparison of languages. He had a very extensive linguistic knowledge, though it cannot be said that he displayed great ability. His numerous works supply useful materials for the study of comparative grammar.

VATE'RIA, a genus of plants of the natural family of *Dipterocarpeæ*. The species are only two in number, *V. Indica*, which grows all along the Malabar coast and in Canara, and *V. lanceæfolia*, which is common in Silhet. Both species form large trees. *V. Indica* grows to the height of about 60 feet, and yields valuable timber,

which is much employed in ship-building, and is not liable to be attacked by the teredo. When the bark is wounded, a pellucid, fragrant, acrid, bitter, resinous fluid exudes, which in the rays of the sun becomes yellow and fragile like glass. This resin is well known in commerce, and is usually called Copal in India, but when imported into England receives the name of Gum Anime. The fluid resin also makes a good varnish. Another very valuable product is yielded by this tree, and that is a fatty substance which is known by the name of the Piney Tallow, or Vegetable Tallow of Canara. This is obtained by boiling the seeds, when the fatty substance floats to the surface, and on cooling down becomes of the consistence of tallow. In colour the different specimens vary from pale yellow or fawn to perfect white. Its general properties, such as its hardness, colour, combustibility, and fusibility, place it between wax and tallow; but it is far superior to the latter, having no disagreeable smell, either when burning or at common temperatures.

VATICAN, or *Il Borgo*, is the name of a division of modern Rome, on the right bank of the Tiber. [Rome.] The Mons Vaticanus was outside the walls of ancient Rome. In the plain between the hill and the Tiber Caligula constructed a circus for chariot-races, and placed an obelisk in the middle of it, the same which now stands before St. Peter's Church. The circus was destroyed under Constantine, who built on its site a church, or basilica, dedicated to the Apostle Peter, whom tradition reported to have been buried on that spot. In the year 1146 Eugenius III. began building a palace near the church of St. Peter for the papal residence, which grew by degrees into an immense mass of buildings, known by the general name of the Vatican. Gregory XI., on his return from Avignon, fixed his permanent residence in the Vatican on account of the protection afforded by the neighbouring castle of St. Angelo. The palace of the Vatican continued to be the residence of the popes until about the middle of the 16th century, when Paul III. built the palace on the Quirinal Mount. The Vatican however is still used on the occasion of grand church ceremonies being performed in St. Peter's.

The old church of St. Peter was a large structure, more than 300 feet in length: it lay lower than the present church, which has been raised above it, and is much larger. Part of the ancient church is become a subterraneous vault under the pavement of the modern building: it contains chapels, and altars, with old monuments, sculptures, and mosaics; and the public have access to it on certain days only.

Nicholas V. was the first who, about the year 1450, thought of building a new church, but the undertaking was abandoned for about half a century, until Julius II. commissioned the architect Bramante to make a plan of the intended structure. The plan of Bramante was a Latin cross, surmounted by a vast and lofty dome. Julius II. himself laid the first stone on the 18th of April, 1506. Bramante, Giulio di San Gallo, Raphael d'Urbino, Peruzzi, Michel Angelo, Barozzi or Vignola, Domenico Fontana, Giacomo della Porta, Carlo Maderno, Fontana, and Bernini, were successively employed on the church and its surrounding accessories, including the Piazza, the fountains, &c.

Such a building as St. Peter's, carried on under so many different hands, and upon different plans, for a period of more than a century, must have faults and incongruities. The portico in front is mostly objected to, as not corresponding to and spoiling the view of the church itself. But with all its faults, St. Peter's as a whole may be safely said to be the most magnificent structure raised by man. Its interior well corresponds with its external appearance: the proportions are so well kept, that the eye, at first, is not struck with the vastness of the edifice, until moving on we examine some of the parts separately. Many large and expensive works have been published describing the building and its gorgeous altars, chapels, sculptures, paintings, &c. The best are by Fontana, Cancellieri, and Poleni.

The assemblage of buildings called by the name of the Vatican, and which extends in an oblong irregular mass north of the church as far as the town walls, consists mainly of—1, the Papal Palace; 2, the court and garden of Belvidere; 3, the Library; 4, the Museum. The Papal Palace contains, among other remarkable objects, the Sistine Chapel and Pauline Chapel, both painted by Michel Angelo. The Sistine Chapel contains the painting of the Last Judgment; the four 'stanze,' or apartments, painted by Raphael; and the 'logge,' or open galleries, painted by Raphael's pupils, under his direction. A corridor, about a thousand feet long, joins the Papal Palace to the building called Belvidere, which serves as a museum. About halfway up this corridor is the entrance to the Vatican Library, which was built by the architect Fontana, under Sixtus V. The museum, or collection of works of art, mostly of ancient sculpture, is the richest of its kind in Europe.

VATTEL, EMMERICH, was born at Couret, in the principality of Neufchâtel, in 1714. He was sent to the university of Basel to study the classics and philosophy; and finally he repaired to Geneva, to study theology. But the writings of Leibnitz and Wolff had more attractions for him than the 'Institutes' of Calvin. In 1741 he proceeded to Berlin, in the hope that the court of Frederick II., who had recently ascended the throne of Prussia, and whose taste for literature was general, might afford a field for his talents. In 1742 he published a defence of Leibnitz's system, which he dedicated to Frederick. His wish was to enter the diplomatic service of Prussia, but no vacancies occurred; and in 1744-5 he entered the service of the king of Poland and elector of Saxony. In 1746 he was sent to Berne as the king of Poland's minister to that republic. His duties were small, and he had leisure for literary pursuits, and to labour on the work by which his name is now chiefly known, his 'Droit des Gens,' or 'Law of Nations.' The first edition of this work was published at Neufchâtel in 1758, but the title-page bears the fictitious place of publication, 'Londres.' About this time he was

called to Dresden and made a privy councillor. He died in December, 1767.

The chief work of Vattel, 'Droit des Gens,' shows no very great acquaintance with treaties, or even with political history. His principal authorities are Grotius, Pufendorf, and Wolff. This work has had a great reputation, and has passed through many editions. Its merits, such as they are, consist in its arrangement, and its being written in an easy style. The matter of the so-called 'Law of Nations' is rather vague, and it would require a very skilful hand to put it into the best practical shape. There is an English edition of Vattel, which Mr. Chitty republished with notes.

VAUBAN, SEBASTIEN LE PRESTRE DE, was born May 1, 1633, at St. Leger de Foucheret, near Saulieu, in Burgundy. At the age of seventeen he entered the regiment of Condé, which was then in the service of Spain. His good conduct soon procured him a commission; and the experience acquired in the field, with a knowledge of trigonometry and mensuration, qualified him for the duties of an engineer.

He had already gained considerable distinction by his gallantry and abilities, when, in 1653, he was taken prisoner by a party of French royalists and brought before Cardinal Mazarin, who easily induced him to enter the French service, and he was accordingly made a lieutenant in the regiment of Burgundy. In 1655 he received a commission in the corps of engineers. During that year he directed the sieges of Landrecies, Condé, St. Guislain, and Valenciennes; and, in 1657, that of Montmédi, where he was wounded. In 1658 he had the chief direction of the attacks at the sieges of Gravelines, Ypres, and Oudenarde. His fame was now established; and after the peace of the Pyrenees, in 1661, he further distinguished himself by the fortification of Dunkirk, Fort Louis, and Mardike, which had been ceded to the French.

When the war recommenced in 1667, Vauban had the direction of those sieges which the king conducted in person, and his services gained him preferment, praise, and a pension.

After the peace of Aix-la-Chapelle (1668) he was made governor of Lille, the citadel of which town he had constructed; and besides conducting fresh works at home, he suggested improvements in the fortifications of Turin and other fortresses for the Duke of Savoy. In 1672 Vauban accompanied the king in his campaign against the Prince of Orange, and for a series of important services, terminating with his successful defence of Oudenarde, he was, in 1674, made brigadier of the French infantry. During the following year the armies of France were compelled to act on the defensive; but in 1676 Vauban besieged and took Valenciennes. During this campaign he was made maréchal-de-camp, and received a pension, besides a present from the king, of 25,000 crowns. In the following year he was made director-general of the fortifications.

The peace of Nimeguen (1678), which relieved Vauban from the duty of taking fortresses from the enemy, enabled him to direct all his energies to the improvement of those which belonged to his country. He rendered the harbour of Dunkirk one of the most important in the north of France, and by erecting new forts and improving those already in existence, gave security to the country on every side.

Hostilities breaking out in 1683, Vauban proceeded in 1684 with the French army into Belgium, where he took Courtray and Luxembourg. The war being suddenly terminated in 1684, he strengthened the fortifications of Luxembourg. About the same time he executed in part the magnificent aqueduct of Maintenon, by which the waters of the Eure were to be conveyed to Versailles. When the war again broke out in 1688, Vauban was employed under the Dauphin in conducting the sieges of Phalsbourg, Mannheim, and Frankenthal. This year he was made lieutenant-general.

During the year 1690 Vauban was rendered incapable of doing any military duty by a severe illness: he recovered however, and next year he besieged and took Mons. In 1692 the siege of Namur was formed under the orders of the king. It lasted 29 days from the opening of the trenches, during which time five strong sorties were made by the garrison. In 1693 he conducted the siege of Charleroi.

In 1694 the seaports being frequently bombarded by the English fleets, Vauban suggested the formation of magazines and casemates which should be proof against the effects of shells and red-hot shot. After the peace of Ryswick Vauban was employed for several years in forming projects for the defence of the country; and in 1698 he commenced the important fortress of New Brisach. In 1703 Vauban proceeded to Namur in order to superintend the repairs of the fortifications; when the king elevated him against his will to the dignity of a Marshal of France.

In 1706, after the battle of Ramilies, Marshal Vauban was sent to command at Dunkirk, and on the coast of Flanders, where he commenced an intrenched camp, extending from Dunkirk to Bergues, by which the town was secured. This was his last public work. He died March 30, 1707.

During the intervals of his services in the field he employed his leisure in composing his three principal works: these are entitled 'Traité de l'Attaque des Places,' 'Traité des Mines,' and 'Traité de la Défense des Places.' During his life he also found time to write a great number of Memoirs on various subjects; and near the end of his days he collected them in twelve folio volumes (MS.). One or two have been since published.

VAUCHER, JEAN PIERRE, professor of historical theology at Geneva, but better known for his works on botany. The first work on botany published by Vaucher was a 'Mémoire sur les Grains des Conferves,' Paris, 1800. In 1803 appeared his history of fresh-water Confervæ ('Histoire des Conferves d'Eau Douce,' &c.), a work which laid the foundation for all subsequent labours in this department of botany. His great work however was his 'Histoire Physiologique des Plantes d'Europe, ou Exposition des Phenomènes qu'elles présentent dans les diverses Périodes de leur Développement.' He received the

first complete copy of this work on his death-bed, in 1841, when he was at a very advanced age. Vaucher, with De Saussure and others, was one of the founders of the Geneva Society of Natural History and Physics.

VAUCHE'RIA, a genus of plants belonging to the inarticulate *Algæ*. The species are found in pools and ditches and stagnant waters, on damp ground, and on the mud of salt-water rivers, and in the sea.

V. dichotoma, large Dichotomous Vaucheria, is one of the most common of the species, and is found in spring and summer, in pools and ditches of fresh water, and Mr. Berkley has found a variety in the sea. *V. clavata*, Clubbed Vaucheria, does not appear to be an inhabitant of Great Britain. It inhabits ditches of clear water, and is interesting on account of the observations made upon it by Unger. He ascertained that the vesicular summits had the power of contraction, and that by this process they expelled the contained sporules, which after their expulsion ascended to the surface of the water. There are nine species of Vaucheria found in Great Britain.

VAUCLUSE, a department in France, formed out of the counties of Avignon and Venaissin, the principality of Orange, the district of Apt, and the valley of the Sault, all formerly belonging to Provence, takes its name from the fountain of Vaucluse, celebrated in the writings of Petrarch, and is bounded N. by the department of Drôme; E. by Basses-Alpes; S. by the Durance, which divides it from Bouches-du-Rhône; and W. by the Rhône, which separates it from Gard and Ardèche. Its greatest length from N.W. to S.E. is 69 miles; its greatest breadth is 38 miles. The area is 1340.6 square miles, and the population is 259,154, which gives 193.31 to the square mile, being 19.56 above the average for the whole of France.

The department is mountainous, all the east and south of it being covered with subalpine ridges, which extend into it from the departments of Basses-Alpes and Drôme. Mont Ventoux, the highest point in the department, is 6629 feet above the level of the sea. Along the left bank of the Rhône however, and along the right bank of the Durance in its lower course, there is a considerable extent of level country, forming the plain of Orange in the north, the plain of Avignon in the centre, extending from Avignon to Carpentras, and the plain of Cavaillon in the south. The mineral wealth of the department consists of iron, coals, lignite, potter's clay, limestone, freestone, and gypsum.

The department is drained by the RHÔNE, the DURANCE, and their feeders. Among the tributaries of the Rhône in this department are the Lez, the Aigues, and the Sorgues (with its affluents the Nesque, the Auzon, and the Ouvèze); the Calavon and the Lèze are feeders of the Durance. There are a great number of canals for the purpose of irrigating the plains. *The fountain of Vaucluse* is the source of the Sorgues; it rises in a cavern in the secluded valley of Vaucluse ('vallis clausa') midway between Apt and Avignon. The spring is sufficiently copious to form at once a stream capable of bearing a boat. Not far distant from the fountain is the village of Vaucluse, in which Petrarch lived; and between the village and the fountain is an old castle in which the poet frequently resided. The department is traversed by 4 national, 22 departmental, and 9 parish roads. The Lyon-Avignon Railway, now in course of construction, passes through Orange and Avignon, from which city there is a railway communication with Marseille and Cette.

The climate is temperate and healthy; the variations of the weather however are rapid, tempests frequent, and the hail is often destructive to vegetation. The soil is poor, and does not produce bread-stuff enough for the consumption: rye, barley, and wheat, are the chief grain crops. Vegetables, owing to the dry nature of the soil, and the long-continued droughts in summer, are deficient in quantity and bad. There is but little meadow-land; but the heaths and open pastures amount to about 70,000 acres. There are numerous flocks of bad sheep. The ass and the mule are much employed in agricultural labour. The vineyards occupy an area of 70,000 acres, and yield about 9,000,000 gallons of strong deep red wine, of which about 5,000,000 gallons are exported, and a small quantity is distilled into brandy. The best kinds are the wines of Côteau-brulé, Châteauneuf-du-Pape, Sorgues, and Beaumes. The department yields abundance of olives, almonds, walnuts, pears, peaches, plums, apricots, figs, and melons. Saffron, large quantities of madder, artichokes, anise, coriander, fustic, the yellow grain of Avignon (the produce of a species of buckthorn), and the evergreen oak, are cultivated. The number of mulberry-trees is between two and three millions; silkworms are extensively reared, and honey and wax are abundant. The woodlands occupy above 150,000 acres.

The department is divided into 4 arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Avignon . .	5	20	76,483
Carpentras . .	5	31	55,714
Apt	5	50	55,420
Orange . . .	7	48	71,537
Total . .	22	149	259,154

Of the arrondissement of Avignon and of the whole department the capital is AVIGNON. *Bédarrides*, prettily situated on the right bank of the Ouvèze, has madder mills and a population of 2420. *Cavaillon*, an ill-built dirty town, on the right bank of the Durance, in a very fertile plain, has madder, oil, and silk mills, a weekly silk market, and 7195 inhabitants. The old fortifications have been demolished; the only building worth mention is the town-hall. The environs are very pretty, and very productive in fruits, garden stuff, sumac, saffron, silk, madder, and teazles. *L'Isle*, a town of 6262 inhabitants, situated in an island formed by the Sorgues, 13 miles E. from Avignon, has manufactures of blankets, silken and woollen yarn, and leather.

In the arrondissement of Carpentras, the chief town, *Carpentras*, situated in a fertile territory at the foot of Mont Ventoux, on the left bank of the Auzon, has an assize court, a tribunal of first instance, a college, and 9776 inhabitants. The town, which is girt by walls flanked with towers, and pierced by four gate entrances, has narrow and crooked streets; but the houses are mostly well built. The cathedral; the gate of Orange, surmounted by a high tower; the court-house, which was formerly an episcopal palace; the Hotel-Dieu, which has a fine façade; the public washhouse; the theatre; the public library, containing 22,000 volumes, 2000 MSS., and 6000 medals, which, as well as the building, were bequeathed to the town by Bishop Inguimbert are the most note-worthy objects in the town. The industrial products of Carpentras comprise brandy, spirits of wine, nitric acid, glue, verdigris, and cotton yarn; it has also silk and madder mills, dye-houses, tanyards, and a considerable trade in liqueurs, fruits, seeds, honey, wool, raw silk, wax, hides, &c. *Mormoiron*, 7 miles from Carpentras, has a population of 2416. *Pernes*, 4 miles from Carpentras, on the Nesque, has 4997 inhabitants, chiefly employed in agriculture. *Sault*, higher up the Nesque, has a population of 2730, chiefly shepherds and graziers.

The arrondissement of Apt is named from *Apt*, an ancient and pretty town, which is situated on the left bank of the Calavon, in a large valley surrounded by hills, covered with vineyards and olive plantations. It is 30 miles E. from Avignon, and has a tribunal of first instance, a college, and 5989 inhabitants, who manufacture cotton and woollen stuffs, wax candles, confectionary, pottery, brandy, silk twist, and leather. Apt is surrounded by ancient solidly-built walls; the principal streets are wide, clean, adorned with fountains, and lined with pretty good houses. The gothic church, which is of high antiquity, and built over still more ancient crypts, is the most remarkable building. This church and the ancient cemetery have been classed among the historic monuments of France. Several Roman remains have been found in Apt, which is said to have existed before the Roman conquest; a Roman bridge (Pont-Julien) of three arches, over the Calavon, is still perfect. There is a good trade in corn, wine, black truffles, fruits, honey, and cattle. *Bonnieux*, 6 miles from Apt on the slope of a hill, has 2804 inhabitants. *Cadenet*, 12 miles S. from Apt, on the right bank of the Durance, in a fertile country, abounding with Roman remains, has a remarkable ancient church, and 2441 inhabitants. *Pertuis*, another ancient town, 18 miles S. by E. from Apt, situated near the entrance of the Lèze into the Durance, has brandy distilleries, and 4380 inhabitants.

Of the arrondissement of Orange the chief town is ORANGE. *Bollène*, in the north of the department, on the Lez, a feeder of the Rhône, stands in a fertile country, and has a population of 4790. *Malaucène*, a busy little town of 3290 inhabitants, is prettily situated in a valley surrounded by picturesque mountains, 18 miles E. from Orange. *Vaison*, said to occupy the site of Vasio, a town of the Vocontii, and built on a steep rock above the Ouvèze, has 2879 inhabitants. *Valréas*, 16 miles N.E. from Orange, stands at the foot of the Dauphiny Mountains, and has dye-houses, tanyards, and a population of 4569.

The department forms the see of the archbishop of Avignon; it is included in the jurisdiction of the high court of Nîmes, and in the 7th Military Division, of which Marseille is headquarters. Under the late monarchy it returned 4 members to the Chamber of Deputies; it now has 5 representatives in the Legislative Assembly of the Republic.

(*Dictionnaire de la France; Annuaire pour l'An* 1851; *Annuaire du Commerce pour* 1850.)

VAUD, a canton of Switzerland, is bounded N. by the canton of Neuchâtel; E. by those of Freyburg, Bern, and Valais; S. by the lake of Geneva; and W. by France. The area is 1180 square miles; and the population in March, 1850, was 199,585, of whom 6962 were Catholics, and the rest belonged to various reformed sects. The central part of the canton is traversed from E. to W. by a succession of heights and a table-land known by the name of Jorat, which seems to connect the Jura with the Alps, and which divides the waters that flow northwards into the lake of Neuchâtel and the Aar, from those which run southwards into the lake of Geneva and the Rhône. [SWITZERLAND.] In the southern part of the canton the vine is planted in terraces along the slopes of the hills, and its cultivation employs above 20,000 persons. These vineyards produce some good white wines. The canton is essentially agricultural: the highlands of the Jura and those of the Alps on the east towards the borders of Bern feed considerable herds of cattle. Horned cattle, sheep, goats, horses, and pigs, are numerous. Corn is not produced in sufficient quantity for the consumption of the population. Fruit-trees are abundant, and the forests cover large tracts. The manufactures are merely for the supply of the internal consumption.

The principal towns of the canton are—LAUSANNE: and *Vevay*, which is beautifully situated 12 miles E. of Lausanne, on the north shore of the lake, and has a handsome church, a college, a public library, and about 5000 inhabitants, who carry on a considerable trade. In the northern part of the canton is *Yverdun*, on the lake of Neuchâtel, with about 3000 inhabitants. *Moudon*, with 2350 inhabitants, and a college, and *Payerne*, with a population of 2700, are situated in the east of the canton on the Broye, a feeder of the lake of Morat. The district of the Jura, and the valleys of the Joux and the Orbe, are noticed under SWITZERLAND. The common people speak a dialect of the old Romance language; the educated classes speak French.

VAUDOIS ('Waldenses,' or 'Valdenses;' in Latin 'Vallesi;' 'Valdési' in Italian; 'Vaudés' in their own dialect), a remarkable people, who form a communion separate from the church of Rome, and who live in three high valleys of Piedmont, on the eastern or Italian side of the Cottian Alps, between Mount Viso and the Col de Sestrieres, in the province of Pinerolo. The valleys are:—1, that of Lucerna, through which

flows the Pelice, an alpine torrent which falls into the river Clusone; 2, the valley of Perosa, through which passes the Clusone, which rises in the Col de Sestrieres, flows S.E. by Fenestrelle, Perosa, and near Pinerolo, and, after receiving the Pelice, joins the Po a few miles farther down; 3, the valley of San Martino, which branches out of the valley of the Clusone, along the course of a torrent called Germanasca. Of these three valleys, the southernmost, that of Lucerna, is tolerably productive: gardens and vineyards, orchards, cornfields, and pastures, are seen in pleasant succession; but the other valleys are little favoured by nature. The inhabitants grow some corn and maize: they have sheep, goats, and cattle, but not many horses. Silkworms are reared in some places, and silk is made. The farmers are mostly métayers, that is to say, they pay to the landowner half the produce of the ground, either in kind or money. Most of the peasantry have with their cottages a few roods of land of their own: some are possessed of a few acres. The three valleys together comprise an area of about 22 miles in length from N. to S., and 18 miles in width from E. to W., confined between the right bank of the Clusone and the left bank of the Pelice. The population amounted, according to Serristori's 'Statistica,' in 1835, to 20,523 individuals of the ancient Vaudois communion, besides about 1700 Roman Catholics scattered about the various communes, mostly strangers, who are carrying on some trade. The Vaudois are distributed in thirteen parishes, each having its pastor. The principal villages are:—La Torre, in the valley of the Pelice, or Lucerna, with about 2000 inhabitants; San Giovanni, Angrogna, Bobbio, and Villaro, in the same valley; Pomaretto, in the valley of the Clusone; San Martino, Villasecca, and Perera, in the valley of the Germanasca. In every parish there is a church and a school, besides a Catholic church for the Roman Catholic population. The origin of the name Valdenses, or Valdesi, is found in the word *vallis*, and means inhabitants of the valleys. Its derivation from Peter Waldo, or Valdo, of Lyon, a merchant, who was a religious reformer, is now abandoned. Waldo being condemned by the archbishop of that city, in 1172, and afterwards by Pope Alexander III., emigrated to Germany, and is said to have died in Bohemia. The Vaudois of Piedmont existed as a religious community long before Waldo, but from him the separatists from Rome in the south of France have been called Waldenses, and this has caused them to be confounded with the Vaudois, or Vaudés, of the Alps. The real Vaudois remained in the valleys east and west of the Cottian Alps. The Albigenses properly so called were quite distinct from the Vaudois. [ALBIGENSES.]

This little community is remarkable for having kept itself from time immemorial separate from the church of Rome, in ages when that church is generally considered as having been the only existing church in the West, and for being the only Italian church which continues to this day separate from Rome.

The Valdenses have always rejected any distinctive sectarian appellation, and have boasted of adhering from age to age to the primitive faith. In 1230 Reinerus, a Dominican friar, in a treatise against heretics, 'Opusculum de Hæreticis,' says of the Valdenses that 'they reject whatsoever is taught, if it is not demonstrable by a text in the New Testament.' And then he goes on enumerating many places where the heretics have churches and schools: all which shows that dissent was very widely spread in north Italy and the south of France in the 13th century, and it corroborates the traditions of the Valdenses, that their doctrines spread at one time over many districts on both sides of the Alps.

The persecutions which the Vaudois have sustained from the Roman Catholic church, and from potentates who were under the influence of that church, fill up a large portion of their history. Botta, a Piedmontese and a Roman Catholic, but a temperate and discriminating writer, has given a full and faithful account of those persecutions.

When Bonaparte annexed Piedmont to France, he placed the Vaudois on a footing of equality with their Roman Catholic countrymen, and assigned funds for the support of their clergy. At the restoration in 1814 the Vaudois were again placed under their former disabilities, and those who had purchased land beyond the limits of their valleys were obliged to sell it to Roman Catholics. The moral character, peculiar position, and prospects of the Vaudois, have been exhibited by several English travellers since the peace, especially by the Rev. W. S. Gilly, in his 'Visit to the Vaudois of Piedmont,' 1831.

VAUGIRARD. [SEINE.]

VAUQUELIN, NICOLAS-LOUIS, was born about the middle of the last century, of poor parents in Normandy. Fourcroy, accidently meeting with him, was so pleased with his quickness and integrity, that he took him to Paris and made him superintendent of his laboratory, in which he became an expert experimenter.

He was a professor of chemistry in Paris, chemist to the School of Mines, and a member of the Institute. He was extremely industrious, and published many memoirs on mineral, vegetable, and animal analysis. In performing his varied researches he not only improved the methods of analysis previously in use, but discovered some elementary bodies, of which the chief and most remarkable were chromium and glucina. He died in 1829, at an advanced age.

VECCHI, GIOVANNI DE', was born at Borgo San Sepolcro, in 1536. He was the scholar of Raffaellino del Colle. His works are numerous in the churches of Rome and its vicinity: he made the cartoons for the two mosaics of the evangelists Luke and John in St. Peter's on the Vatican. He died in 1614.

VE'CCHIA, PIE'TRO, was born at Venice in 1605. His real name appears to have been Mattoni, and he acquired the name of Vecchia from his ability for imitating and restoring old pictures. He made the designs of many of the mosaics in the church of San Marco at Venice. His easel pictures were generally of low and comic subjects; his drawing and colouring were excellent. He died at Venice in 1678.

VECE'LLIO, TIZIA'NO, commonly called TITIAN, was born at Capo del Cadore, in the Venetian state, in 1480, according to the most received account. He studied painting at first under Sebastiano Zuccati, and shortly afterwards with Gentile Bellini, whom however he soon left for Giovanni Bellini, his brother. After the death of Giovanni in 1512 Titian was employed by the state to complete a work in the Sala del Gran Consiglio of the Homage of Frederic Barbarossa to Pope Alexander III., which he had left unfinished. The senate was so well satisfied with the work, that they presented him with the office of La Senseria, with a salary of about 300 crowns per annum. He painted while in this situation the portraits of the doges Pietro Lando, Francesco Donato, Marcantonio Trevisano, and the Venieri.

In 1514 Titian painted his Bacchus and Ariadne, and other Bacchanalian and similar works in the palace of Alfonso I., duke of Ferrara. In 1516, shortly after he returned from Ferrara to Venice, he painted in oil his picture of the Assumption of the Virgin, for the great altar of the church of Santa Maria Gloriosa de' Frari. He was invited by Leo X. to Rome, and Raphael also entreated him to make the journey; the deaths however of the Pope and Raphael, in 1520, put an end for a time to the project. He was invited likewise about the same time by Francis I., whose portrait he painted, to France; an invitation which he showed no disposition to accept. In 1528 he painted his celebrated picture of St. Peter Martyr, for the chapel of that saint, in the church of SS. Giovanni e Paolo; and immediately after he received a commission to paint the Victory of the Venetians over the Janissaries in the great council-chamber at Venice, which was considered the best picture there: it perished by fire, but there is a print of it by Fontana. In 1530 the Emperor Charles V. sent for him to Bologna to paint his portrait: he painted that of Ippolito de' Medici at the same time, besides portraits of many other distinguished personages. Titian went from Bologna to Mantua with the Duke Frederico Gonzaga, for whom he executed many works. In 1532 he went again to Bologna, and painted Charles V. a second time: about this time he appears to have accompanied Charles into Spain, and remained there three years, during which time he executed many celebrated works. Between 1536 and 1545 commissions crowded in upon him, and he executed a variety of works. A letter from Aretin to Titian, of 1545, shows in what great favour Titian stood with the government of Venice: it speaks of his large pension, and the many imposts from which he was exempted. In this year Titian visited Rome, and painted Paul III., the Cardinal Farnese, and Duke Octavio Farnese in one group. Late in 1547 he was invited by the Emperor to Augsburg, whither he went in the beginning of 1548. After the death of Charles V., Philip II. continued the patronage of Titian, who executed many works for that sovereign.

In 1566 Vasari visited Titian, and, although he was then 86 years of age, he found him with his pencil in his hand, and derived great pleasure from his conversation. The pencil of Titian however was active for ten years more, though the pictures he produced at this time were careless and slight in their execution. He died of the plague in 1576, with the reputation of the greatest colourist and one of the greatest painters that ever lived.

Ridolfi and others have written biographies of Titian, and Northcote the painter wrote, or, as some say, got Hazlitt to write for him, 'The Life of Titian, with Anecdotes of the Distinguished Persons of his Time,' London, 1830, 2 vols. 8vo.

VECELLIO, FRANCESCO, the brother of Titian, was born at Cadore, in 1483; and commenced life as a painter. He afterwards became a soldier, returned to painting, and then again forsook it in 1531 for the life of a merchant, as is reported, by the advice of Titian, who is said to have been jealous of him: he was a painter of great ability. There are several excellent pictures by him in the Venetian state. He died in 1560.

VECELLIO, ORA'ZIO, the son of Titian, was born at Venice in 1515. He was an excellent portrait painter, accompanied his father to Rome, and assisted him in most of his works. Many of Orazio's portraits are said now to be attributed to his father. He died at the same time as his father, in 1576, of the plague.

VECELLIO, MARCO, called Marco di Tiziano, was the nephew of Titian, and was born at Venice in 1545. He painted in a style similar to Titian, and executed many good works. He died in 1611.

VEDA (from the Sanscrit root *vid*, 'to know') means the sum of all knowledge; or, according to another etymology, the knowledge which contains the evidence of its truth within itself—that is, revelation. But this term, although in some instances it combines the whole learning (the eighteen vidyâs or sciences) of the Hindoos, is specially applied to the four principal books of their sacred writings,—the Rĭch, Yajush, Sâman, and Atharvan'a. The Rĭgveda (from the radical *rĭch*, 'to laud') is intended to be read on occasions when encomiastic prayers and hymns to the elemental deities are prescribed by the law; the Yajush (from *yaj*, 'to sacrifice') relates chiefly to oblations and sacrifices, and contains prayers adapted for certain rites to be performed at the full and change of the moon, and hymns and directions regarding oblations to the manes; the Sâmaveda contains songs of lyrical character to be recited with melody; and the Atharvaveda, which is considered to be of later date, and is seldom included in the term 'the Vedas,' consists of various hymns and incantations, the greater part of which are intended for the destruction of enemies. To these books the Hindoos attach the greatest sanctity. They state that Brahmâ himself made them proceed from his mouth, or that he milked them out from fire, from air, and from the sun ('Manu,' i. 23), for the due performance of the universal sacrifice. According to this tradition they were coeval with creation, which had itself taken place according to the laws of a pre-existing Veda. They were however scattered; some legends state that they were lost; and it was not till after many years that a Rĭshi 'or sage,' arranged them and gave them the form in which they now are.

This arrangment procured to the editor the name of Vyâsa, 'the arranger.' He is said to have lived about 5000 years ago; hence his surname of Dwâparâyana, that is, he who belongs to the second age, or yuga, of the world. When he had distributed the fragments of the Vedas into four parts, he taught them severally to four different pupils. In the course of time the pupils of these four altered some things in the arrangement of the several Vedas, and thereby they became founders of different schools, which are termed S'âkhâs, and are very numerous. But the difference between these various schools of the Veda, chiefly rests upon a mere transposition of the various hymns which constitute their Sanhitâs, or collection of sacred songs, and has consequently no influence on the doctrine which they contain.

Each of these four Vedas is divided into two parts, the Sanhitâ, and the Brâhman'a, the latter of which is a collection of precepts and maxims (Colebrooke, i. 12, note), or, according to Jones's translation of 'Manu,' iv. 100, of chapters on the attributes of God. Under the head of the Brâhman'a of a Veda the Hindoos comprehend also the various Upanishads which belong to it: these are of a more dogmatic character, and exhibit in a more comprehensive form the doctrines which are obscurely expressed in the fragments, which in fact are all that can be truly said to form an original Veda. The four Upavedas or subvedas, and the six Vedângas or supplementary parts of the vedas, with the Upângas, or subordinate parts, constitute in great measure that kind of literature which enables one better to understand the tenor of the sacred Trayî (the name under which the three vedas are collectively understood: it means Triad). The age of the Vedas has been the subject of conflicting opinion. The date now generally assigned to them is the 14th and 15th century before the Christian æra.

The fundamental doctrine of the Vedas seems to be this: The various elements which constitute this universe are only the various parts of the universal and primeval soul, the objective That, which by the very dismemberment of itself had lost its subjectivity. Throughout the Vedas there runs a strong vein of belief in the fall of man, who though he had received his own existence through the self-immolation of the Creator, and was originally part of him, had lost his primeval purity, to recover which, sacrifices of various kinds were ordained in imitation of the great, original, and universal sacrifice. The Vedic monotheism, which one would sometimes be inclined to doubt from the numerous Devatâs or elemental deities, who are invoked in the Mantras, will appear plainly enough if the reader has the patience to read the following passage: 'The deities are only three; whose places are the earth, the intermediate region, and heaven: (namely) fire, air, and the sun. They are pronounced to be (the deities) of the mysterious names (Bhur, Bhuvar, and Swar), called the Vyâhrîtis (see 'Manu,' ii., v. 76) severally; and Prajâpati (the lord of creatures) is (the deity) of them collectively. The syllable Om means every deity; it belongs to him (Paramesht'î) who dwells in the supreme abode, &c. Other deities belonging to those several regions are portions of the (three) gods; for they are variously named and described on account of their different operations: but (in fact) there is only one deity, the great Soul (Mahân âtmâ).' Numerous passages of the same kind occur in almost every page of the Vedic literature, by which we mean the Upavedas. The article 'Veda' in the 'Penny Cyclopædia,' will give much information to those who are curious on this matter.

VEERDT. [Limburg, *Dutch.*]

VEERING, or WEARING (from the French, *virer*), is that movement of a ship in which, supposing her to have been previously sailing with the wind on either bow, she is brought, by her head being turned to leeward, into a contrary position, so that the wind is on the other bow, and the direction of her course is changed.

When a ship has not sufficient velocity to allow of being *put about* by tacking, and it becomes necessary to change her course by veering, the evolution is thus effected:—As soon as, in drifting to leeward, the ship begins to fall off, or to turn her head from the wind, the helm is placed hard a-weather, and the after-sails are hauled up so that the wind may act upon the others only, and that the ship may be brought before the wind: the helm is then placed exactly fore and aft, and the velocity of rotation continuing, the ship's head begins to turn towards the wind, which will then be on the opposite bow. The helm being now turned to leeward, the mizen-sail hauled out and its stay-sails set, the ship comes rapidly into the required position. The disadvantage of veering is that, during the evolution, the ship is sometimes carried far to leeward, and the loss of space can only be diminished by executing the movement with as much rapidity as possible.

Box-hauling is an evolution similar to that of veering, and is put in practice when a rock or some other danger is suddenly seen a-head.

VEGA CARPIO, FRAY LOPE FELIX DE, was born at Madrid Nov. 25, 1562. The son of a poet, he himself manifested extraordinary poetic facility at a very early age. He had written several poems and four dramas before he was 13 years of age. Soon afterwards he ran away from school in order to 'see the world;' but he was overtaken at a short distance from Madrid, and consigned to his friends. Upon his return to Madrid, young Lope, by means of several pastorals, and a comedy in three acts, called 'La Pastoral de Jacinto,' ingratiated himself with the bishop of Avila, through whose liberality he was enabled to enter the university of Alcalà, where he remained four years. Lope next became attached to the Duke of Alva, as whose request he wrote his 'Arcadia;' which, though written perhaps as early as 1580, was not published till 1598. Lope had previously married a lady of rank, Doña Isabel de Urbino. He continued to cultivate poetry with increased enthusiasm, until, having wounded a gentleman of rank in a duel, he fled to Valencia, and it was some years before he ventured to return to his family. Soon after this his wife, to whom he was tenderly attached, died; and to escape from painful recollections Lope became a

soldier, and joined the 'invincible Armada.' During this unfortunate voyage Lope composed his 'Hermosura de Angelica.' Lope now quitted the career of arms, and entered the service, first, of the Marquis of Malpica, and afterwards of the Count of Lemos, with whom he remained until his second marriage, to Doña Juana de Guardia, a lady of Madrid. About eight years after this event, in 1598, on the occasion of the canonisation of St. Isidorus, Lope entered the lists with the best poets of the day, and surpassed them all in the number and merit of his performances.

This was perhaps the most fortunate period of Lope's life. He had, by his own statement, written already no less than nine hundred dramas for the stage, besides twelve volumes of other poetry; he wrote so much, and had so many presents conferred upon him, that he was enabled to live in affluence. But the spirit of the poet seems to have sunk under the loss of his second wife and a son whom he dearly loved, and he resolved to soothe it by the exercise of devotion. Accordingly, having become secretary to the Inquisition, he became priest, and in 1609 a sort of honorary member of the brotherhood of St. Francis. Meanwhile he seldom passed a year without giving some poem to the press; and scarcely a month, or even a week, without producing some play upon the stage. In a very short space of time 'Los Triumphos de la Fé,' 'Las Fortunas de Diana,' three novels in prose, 'Circe,' an heroic poem, and 'Philomena,' were the fruit of his prolific pen.

His 'Soliloquies of God,' though printed under a feigned name, secured him as many admirers as his former productions. His 'Corona Tragica,' he dedicated to Pope Urban VIII., who conferred on him the degree of doctor of theology. He was at that time regarded with unbounded admiration both at home and abroad. He continued to publish plays and poems till the year of his death, when his health began to decline, and he expired Aug. 26, 1635.

In addition to the works mentioned above Lope wrote several epic poems, as 'La Jerusalem Conquistada;' 'La Circe;' 'La Dragontea' (on the death of Sir Francis Drake'); 'La Andromeda;' numerous pastorals; 'Los Pastores de Belen;' 'La Dorothea,' &c., &c.; a burlesque poem, entitled 'La Gatomachia;' several epistles, and other short poems, which were collected and printed at Madrid, 1776–79, 21 vols. 4to.

Lord Holland has given, after Huerta, a list of all the dramas attributed to Lope de Vega, which exist in print. There are 497 plays, and 21 'Autos Sacramentales,' in all 518, to which number may be added many which have been lost, and many more which, though acted on the stage, were never printed, besides those which are preserved in manuscript. It has been stated that no less than 1800 of his plays were acted on the stage. There is an edition, consisting of 25 volumes in 4to., published in parts between 1609 and 1647, at Madrid, and other places in Spain, which is of excessive rarity.

VEGETABLE BUTTERS. [BUTTERS, VEGETABLE.]

VEGETABLE MORPHOLOGY, or METAMORPHOSIS, is that department of science which contemplates the laws which regulate the forms of plants and of their particular parts. In the earlier period of the history of botany, plants were studied as individuals or groups of individuals, without any reference to the general laws which governed either the external or the internal forms of plants, or those which influenced the production of various forms in the same individual at different periods of its existence, or of the same species under varying circumstances.

Linnæus, although he never made any practical application of his idea, seems to have been the first to have suspected that the varied forms of the flowering organs, and even other appendages of the axis of the plant, were modifications of the leaf. In his 'Philosophia Botanica,' he has the following remarkable passage:—'The origin of the flowers and the leaves is the same; the origin of the buds and the leaves is the same: the bud consists of the rudiments of the leaves; the flower comes from the rudiments of the leaves united.' Although the doctrine of morphology, to a limited extent, was thus aphoristically proclaimed by the great Swede, and many facts pointed out by him to prove its truth, yet little or no notice was taken of this department of science by his followers. The next person who drew attention to this subject, and apparently quite independent of Linnæus, was not a botanist, but a poet. Göthe frequently occupied himself with natural history studies; and in one of his letters, dated 1786, mentions that he believed he had discovered 'the whole secret of the generation and organization of plants, and that it is the simplest thing that can be imagined.' It was some years after that he first published his poem on the metamorphoses of plants, in which he distinctly states the great law of morphology, that every part of the plant is but the repetition of a primitive type. This was followed by a paper on the subject, in which he clearly points out the importance of this idea of the unfolding of a primitive type. At the time these papers were published they were regarded as the fancies of a poet rather than the sober realities of science. In Great Britain they found but little favour, but were quietly thought over by Robert Brown, who by a series of accurate observations demonstrated the practical value of the morphological idea in the arrangement of the various families of plants. The idea of Göthe was also adopted by De Candolle, in his doctrine of a primitive type among plants, from which all departed by the decrease, increase, and adhesion of their organs.

Morphology may be divided into two great divisions. First, that which treats of the forms of plants and their organs in general, and which is only concerned with a few of those general forms which are found common to all plants; and secondly, that which treats of the forms of particular groups of plants and of individual organs. This latter department is by far the most extensive, and is that which contributes so greatly to the just apprehension of the relations which exist between the various groups of plants and their

organs. It may be divided into two parts, one of which regards the external form of the plant, as resulting from the combination of the various tissues into organs; the other treats of the internal form which the various tissues of the plant assume.

There are certain general principles in morphology which have been everywhere assumed in describing the organs of plants, such as that every plant has an ascending and descending axis; the former called the stem, and the latter the root. These may be traced downwards or upwards through the various series of plants: downwards till we arrive at a point where the cells exhibit no tendency to either an ascending or descending growth, as in the cells of Protococcus; or upwards till the increasing development of the stem exists in the most complicated variety of forms. It is in the latter or higher groups of plants that the laws of morphology have been studied with greatest attention, and have led to the belief that its only application existed in the series of changes which the leaf of the higher plants undergoes in its conversion into the parts of the flower and the fruit. It is from this department of botany that the most convincing illustrations of the truth of the laws of morphology may be drawn, and it is here that the most obvious practical applications of them may be made; but form does not more distinguish the higher than the lower plants, and in many of the phenomena of the latter morphological laws as general may be applied as to the highest plants.

The leaf however affords the best illustration of the nature of morphological laws. This organ may be regarded as a theoretical point of departure for all other organs which are found upon the stem. The word theoretical is used here to prevent the supposition ordinarily entertained, that organs which are said to be metamorphosed have ever really been leaves at all. The leaf is only the theoretical type on which the other organs are formed, and from which they are supposed to have departed. In support of this theory we have the fact, that all the organs of the axis may be traced by insensible gradation either to or from the leaf. Thus the bract is often undistinguishable from the leaf, the sepal from the bract, the petals from the sepals, the stamens from the petals, the carpels from leaves, and the ovules from leaf-buds. This is the series of gradations which prove the positions of morphology. When these gradations take place, as they mostly do in nature, from the leaf to the internal organs of the flower, it is called an ascending metamorphosis; when it takes place from the central organs of the flower to the leaf, it is called a descending metamorphosis. This latter phenomenon is frequently observed in cultivated plants, and such changes are called monsters. Most of the double flowers of our gardens are the result of a descending metamorphosis, in which petals are developed instead of stamens. As an instance of organs which have not assumed the development of leaves, but which yet are formed on the same type and obey the same laws, we may name the stipules and scales of leaf-buds.

The result of these facts is that we may regard the flower as a collection of leaves arranged in whorls, and in fact a branch with a short axis. This idea explains at once those apparently anomalous occurrences where branches grow out of the fruit of the pear or the apple. The apple does but represent the growing point of a branch, which, if the circumstances no longer exist which produced the peculiar leaves from which it is formed, will take the ordinary growth of a branch. The admission of these principles has led to the expression of certain laws which regulate the growth of the flowers and fruits of plants, and which, being applied to their peculiarities, are the best means of securing a natural classification. These laws are:—1. That each series of floral envelopes must normally alternate with that which preceded it. 2. That the number of parts in every series must be equal to or a multiple of the number of parts in the first or outer series. The actual departures from this theoretical structure are numerous, but they may be reduced to the simple conditions of the increase, decrease, or adhesion of the various organs, which also obey definite laws.

VEGETABLE WAX. Various plants yield a substance like wax, which is obtained, like the Vegetable Butter, by bruising and boiling them in water, when the wax melting floats to the surface and there concretes on cooling. Of these the most remarkable instance is the *Ceroxylon andicola*, the Wax Palm, Palma de Cera of the American Spaniards. Myrica Gale, Candleberry Myrtle, or Sweet Gale, a native of this country, yields a substance resembling bees'-wax when its catkins or cones are boiled in water: so *M. cerifera*, a native of North America, yields a similar substance when its berries are thus boiled: candles are made of it also, whence the plant is commonly called Tallow-Shrub or Candleberry-Tree. *M. quercifolia*, a native of the Cape of Good Hope, is another species which yields a vegetable wax. It grows along the coast, on dry sandy plains exposed to the sea-air, where hardly any other plants will vegetate. The wax invests the berries in the form of a rough crust, which is separated by means of boiling water. It is of a greenish colour, but may be bleached. When made into candles it gives a very fine light. A vegetable wax is also obtained in China from *Ligustrum lucidum*, which is frequently mentioned as the Wax-Tree in Dr. Abel's and other travels.

VEGETABLES. VEGETABLE KINGDOM. Although the more common objects in nature are easily referred to the respective kingdoms to which they belong, as a block of granite to the mineral kingdom, an oak to the vegetable kingdom, and a man to the animal kingdom; yet each of these kingdoms has referred to it objects whose characters are of a doubtful nature. It is on this account that naturalists have sought for a definition of these kingdoms that would enable them at once to refer to one or the other the various objects in nature. With this view Linnæus laid down the following axiom —'Mineralia crescunt; vegetabilia crescunt et vivunt; animalia crescunt, vivunt, et sentiunt.' But this will not assist the naturalist much.

The mineral kingdom is perhaps not often confounded with the other two, although its distinction could not always depend on the definition of Linnæus. The distinction given between the animal and vegetable kingdoms is the possession of sensation by the former. But how is sensation to be determined? If by motion from external stimuli, then ought the sensitive-plant and Dionæa to be called animals, and sponges and jelly-fishes plants; if, on the other hand, the possession of a nervous system is to determine the point, then, as we have failed to demonstrate this in the sponges and polyps, they must still be called plants. Cuvier defined an animal by its possession of a stomach; but this fails of being a distinctive mark in many of the lower classes of what are generally admitted as animals; and the Aristotelian indication, the possession of a mouth, cannot be always applied. There is in fact still a great difficulty in determining the limits of the vegetable and animal kingdoms; and botanists and zoologists are constantly putting in their claims for the right of exclusive study of certain beings which exist at the point where the animal and vegetable kingdoms meet. That there is such a point may be easily made apparent by tracing the groups of plants from the exogens through the endogens down to the lower forms of fungi and algæ, and animals from the Mammalia, through birds, reptiles, fishes, mollusks, and polyps, down to the infusoria and sponges.

The following is the definition of a plant by an eminent botanist, and is, perhaps, as good as can be given in the present state of our knowledge: —'A plant is a living body deprived of sensation or power of moving from place to place, and fed by means of external roots.'

The vegetable kingdom performs important offices in the economy of creation. It stands between the mineral and animal kingdoms, disposing and arranging the elements of the first, in order to fit them for the purposes of the last. Each of the three kingdoms of nature is composed of matter as its basis; but the animal kingdom directly appropriates no portion of the elements of the inorganic world to its uses, but derives them all from the vegetable kingdom. The researches of modern chemists, more especially those of Mulder and Liebig, show that the proximate principles of animal bodies are identical with those of vegetables, and that consequently, as these principles do not exist in the inorganic kingdom, they must have been formed in plants. Thus we must regard the vegetable kingdom as one vast chemical laboratory, in which the food of animals is being prepared. Without vegetables animals would perish, and although some animals live on the flesh of others, yet that flesh is always originally derived from the vegetable kingdom. The proximate principles of plants are not numerous, and are composed of hydrogen, oxygen, nitrogen, and carbon; those containing nitrogen are directly appropriated by animals to the formation of their tissues, whilst those containing no nitrogen are either consumed in generating animal heat, or deposited in the form of fat. When animal bodies cease to exist, their tissues become resolved into their primitive elements, a process which is constantly going on in animal bodies during life. These elements, in the state of various compounds, are carried off into the atmosphere, when gaseous; or assist in forming the soil on the surface of the earth, when solid. The principal compounds which are thus generated are carbonic acid and ammonia; and if accumulation of these gases took place to any extent in the atmosphere, the consequences would be a cessation of vitality, in both the animal and vegetable kingdoms; but here again plants perform an important office, for these very compounds, combined with water, are the principal sources of the elements which plants elaborate into so many secretions necessary to the existence of animals.

VEGETATION, the collective phenomena presented by plants in their distribution over the surface of the earth. It is not till within a comparatively recent period that any attempt has been made to ascertain in what manner the varied forms of plants are distributed over the surface of the earth, or what causes determine the existence of one plant in a particular locality or country, to the exclusion of others. The labours of Humboldt, Von Martius, and Schouw, have done much towards elucidating the former point, and the progress of vegetable anatomy and physiology is constantly revealing the causes of the latter circumstance. It has indeed been known for a long period that the ordinary productions of one country were not to be obtained from another, and that the vegetation of cold and hot countries differed; but this knowledge, up to the time of Linnæus, was of the most general and unsatisfactory character.

The great agents which seem to determine the distribution of plants on the earth are Light, Heat, Water, Soil, and Atmosphere; those external conditions in fact which most influence their vital functions. The general influence of these agencies have been examined by De Candolle, who comes to the following conclusions:—

1. The natural situation of each plant at a determined elevation above the level of the sea is so much greater in proportion as the country is nearer the equator, and less in more temperate regions.

2. In temperate climates, as France, for instance, those plants which are but little affected by temperature, and which grow in all its latitudes, are also found at all those elevations where the earth is not covered with perpetual snows.

3. Of plants which, according to their nature, avoid either too high or too low a degree of temperature, yet grow at different latitudes, we may observe, that it is at heights where the effect of elevation may compensate that of latitude: thus the native plants of the northern plains will be seen to grow upon the mountains of the south.

4. Plants which are cultivated upon a large scale are guided by laws which entirely correspond with the preceding: those which are cultivated in various latitudes will grow indifferently at various heights; those which are only found at certain latitudes will extend no farther than to proportional elevations.

5. The elevation above the level of the sea, when we compare the temperature of the seasons, establishes effects very analogous to those which result from the distance from the equator; so that there is the more analogy between the results on vegetation in the two cases. In proportion as we rise in a direct line, it follows, from the lessened density of the air, that the intensity of the solar light continues to increase: this effect is represented in the line of distances from the equator, because the perpetuity of light during the continuance of vegetation is so much the greater in proportion as the latitude is higher.

6. In proportion to the greater height upon the mountains, so will the hygrometer be seen to indicate a less degree of humidity: the same general effects take place as we recede from the equator to the poles.

VEGE'TIUS, FLA'VIUS RENA'TUS, a Latin writer on the military art, who lived and wrote about A.D. 385, in the reign of the Emperor Valentinian II., to whom his work is dedicated. It consists of five books, and bears the title, 'Epitome Institutorum Rei Militaris.' It is written in a plain and easy style. Vegetius appears to have derived most of his materials from earlier writers, among whom he mentions Cato the Censor, Cornelius Celsus, Frontínus, Paternus, and the Constitutions of Augustus, Trajan, and Hadrian, concerning military affairs. The work of Vegetius is a valuable relic of antiquity. There is a good edition by P. Scriverius, with commentaries by G. Stewechius and F. Modius, Antwerp, 1607, 4to. It contains also some other ancient works on military affairs. The best edition is that of N. Schwebel (Bipont, 1806, 8vo.).

VEINS. [Circulation of the Blood; Heart.]

VEINS, DISEASES OF. Of these the most frequent is that in which they become what is called Varicose, that is, dilated and unnaturally tortuous, a disease which occurs especially in the subcutaneous veins of the lower extremity. It is the result of the coats of the veins losing their elasticity, and thereby their power of resisting the pressure of the column of blood above them. The loss of elasticity is commonly due to disease of their coats, and is frequently accompanied by an increase in their thickness, and by destruction or impairment of their valves.

For this varicose state of the large veins numerous remedies have been proposed; but the best are only palliative.

That which is particularly termed a *Varix* is either a mass of dilated and tortuous veins, or a single saccular and circumscribed dilatation of a vein analogous to the circumscribed aneurism of an artery. This circumscribed dilatation is a very rare disease, but in its consequences does not differ from ordinary dilatation. An aneurismal varix is produced when, a communication being made, either by a wound or by ulceration, between an artery and a vein, the latter is dilated by the force of the arterial blood into a circumscribed sac.

The most serious disease to which the veins are subject is acute inflammation, or Phlebítis. It sometimes occurs after the slight wound made in ordinary bleeding; it is more common after operations upon varicose veins; and yet more frequently occurs after amputations of the limbs. Slight cases of phlebitis not unfrequently come on, as if spontaneously, or after exposure to cold, in varicose veins. The more severe phlebitis is a most dangerous disease. Lymph is effused into the cavity of the vein, and into the tissue of its walls, rendering them thick and hard; the vein and the tissues immediately around it become exquisitely tender, and the parts whose blood should be returned through the diseased vein are usually œdematous. In a further stage pus is effused into the cavity of the vein, and, mixing with the blood, it may pass into the general current of the circulation, though more commonly the vein is obliterated above the chiefly inflamed part by lymph deposited on its walls, and thus the passage of pus into the circulation is prevented. With the local inflammation of phlebitis a state of low typhoid fever, with muttering delirium and great exhaustion, is usually combined; and under these the patient dies.

One of the most fatal forms of phlebitis is that which affects the veins of the uterus and the neighbouring parts after labour, and which chiefly constitutes one of the diseases included under the name of Puerperal Fever. *Phlegmasia dolens*, or *Phlegmasia alba*, is due to phlebitis of a less severe kind affecting the iliac or femoral vein, or both, and many others adjacent to them. By obliterating the venous trunks, and preventing the circulation through them, the disease gives rise to the firm œdema, accompanied by the tightness and glossy paleness of the skin of the leg and thigh which peculiarity indicates it.

VELAY, LE, a subdivision of Languedoc, in France, is now comprised in the department of Haute-Loire. Le-Puy was its chief town.

VELA'ZQUEZ, DIE'GO RODRIGUEZ DE SILVA Y. Velazquez was born at Seville, and baptized there June 6, 1599. Having manifested, while yet a child, a decided turn for drawing, he was placed under Francisco Herrera el Viejo. He was driven by ill usage from this studio, and entered that of Francisco Pacheco, who was the very opposite of Herrera. The mediocrity of this master happily had no influence upon Velazquez. After five years' nominal instruction, he married Juana, Pacheco's daughter; and, thrown on himself, the young artist turned to Nature for his guide, and he followed her faithfully to the end. His pictures of this period are very scarce. The Adoration of the Shepherds, now in the Louvre, is the earliest of his undoubted productions, but it is nothing more than a copy from Spagnoletto.

Velazquez visited Madrid in the spring of 1622, and having painted the portrait of the poet Gongora, returned to Seville. But he was recalled to Madrid, the next year, by Olivares, the prime minister. Velazquez, having painted the great man's portrait, stepped at once into fame and fashion. He was forthwith appointed the court painter; and Philip IV. ordained that no one but Velazquez should paint his portrait.

Velazquez at last obtained the royal permission

to go to Italy, and he embarked at Barcelona, Aug. 10, 1629. He visited Venice, Ferrara, and Rome, being everywhere received in an artistical triumph. Urban VIII. assigned to him an apartment in the Vatican, where he diligently copied Raphael and Michel Angelo; but this study never produced the slightest change in the Spaniard's style. Velazquez remained a year in Rome; he only sent home two original pictures, his Jacob with the Garment of Joseph, and Apollo at the Forge of Vulcan; both are now at Madrid. From Rome he passed to Naples, then a Spanish possession, where he felt at home amid the works of Caravaggio, Stanzioni, and Ribera.

He returned to Madrid early in 1631, and now painted the magnificent equestrian portrait of Philip IV., from which Montañez made a model in wood, in order to be sent to Florence, where it was cast in bronze by Pedro Tacca, and now exists in the gardens of the Buen Retiro. The success led to new honours: Velazquez was appointed to an office about the king's person, and in that capacity followed Philip into Aragon and Catalonia in 1643 and 1644. In Nov., 1648, Velazquez made a second journey into Italy, in order to purchase modern pictures for the king, and procure moulds from the best antique statues for a projected academy. At Rome he painted the portrait of Innocent X., which is now the gem of the Doria collection. He was elected a member of the Academy of St. Luke.

He returned to Madrid in June, 1651. He was now in his full power, and painted his finest pictures. In 1656 he received the much-coveted cross of Santiago, and about the same time was raised to the lucrative and honourable post of Aposentador Mayor. He was sent in 1660 to prepare the royal quarters during the journey from Madrid through the ill-provided Castiles to the Bidassoa. Returning to Madrid, worn out with fatigue, he fell sick, and died one week afterwards, Aug. 7, 1660. In seven days his wife, broken-hearted at his loss, followed her gentle and excellent husband, and was laid by his side in the same grave.

His genuine and finest works remain at Madrid: in other cities of Spain they are quite as rare as in every other part of the world. There is no branch of the art, except the marine, which he has not pursued, and he attained almost equal excellence in all. His portraits baffle description and praise. He drew the minds of men: they live, breathe, and seem ready to walk out of the frames. Velazquez had a wide range of subjects, and was almost perfect throughout, whether painting high or low, rich or poor, young or old, human, animal, or natural objects. His dogs are equal to Snyders; his horses to Rubens. His beggars and urchins rival those of Murillo. Neither Teniers nor Hogarth ever came up to the wassail of his drunkards. He is by far the first landscape painter of Spain: his scenes are full of local colour, freshness, and daylight, whether verdurous court-like avenues or wild rocky solitudes. His historical pictures are pearls of great price.

VELEIA, an ancient city at the base of the Apennines, 23¼ miles south from Piacenza and 45 miles from Parma by the existing roads. Under the Empire this place was a municipium. At some time, probably about the fourth century of our æra, the town was destroyed by a quantity of earth and rocks being rolled over the city. This catastrophe was probably caused by the waters of a small lake high up in the mountains of Moria and Rovinazzo, two miles from the city.

The first discovery on the spot was made in 1747, when the bronze tablet of Trajan, Tabula Alimentaria, as it is called, was found there. Excavations were made in 1760 by the order of the Duke of Parma, when the foundations of the forum, and of other buildings, were discovered, with statues, medals, money, and small implements of various kinds. Another bronze tablet was also discovered, which contains a portion of a Roman law for regulating procedure in Gallia Cisalpina. The ruins which have been excavated show the plan of the forum and of the amphitheatre. In the forum there was a basilica. The city was well provided with sewers and drains. The Museum of Parma is rich in bronze statues, marble inscriptions, and in bronze stamps for marking goods or pottery, collected in the excavations of Veleia.

VELEZ-MALAGA, a town of Spain, in the province of Malaga, is situated near the mouth of the river Velez, and has about 14,000 inhabitants. The town is slightly elevated above the left bank of the stream, and is commanded by the neighbouring hills. The streets are wide, clean, and tolerably well paved. It was taken from the Moors by Ferdinand on the 27th of April, 1487, after a siege of about a month. The town contains two parish churches, six convents, several houses of charity, a prison, public granary, &c., and some fine public promenades. The environs are exceedingly fertile, producing sugar, coffee, cotton, cochineal, large quantities of excellent wine, silk, oil, the sweet potato, &c. In the town are sugar-mills and manufactories of hats, soap, brandy, &c. The climate is very hot in summer.

VELINO. [Spoleto-e-Rieti.]

VELLA, a genus of plants belonging to the natural order *Cruciferæ*. *V. annua* was found in the time of Ray on Salisbury Plain, but has not since been noticed. *V. pseudocytisus*, False Cytisus, or Cress-Rocket, is a native of Spain. This shrub, though generally kept in a greenhouse, is sufficiently hardy to live during the winter in the border in a warm aspect.

VELLUM. [Parchment.]

VELOCITY, the name given to the proper measure of the speed with which a change takes place. When the speed is always the same, the velocity is measured by the work done in a unit of time: thus we speak of 10 miles an hour, meaning that in every fraction of an hour, the corresponding fraction of 10 miles is moved over. When the speed is not uniform, the proper measure of velocity requires the introduction of those considerations on which, as far as its principles are concerned, the Differential Calculus is founded. The reader will find the discussion in the 'Penny Cyclopædia.'

VELVET, a variety of the silk manufacture,

remarkable for the softness of its surface. This softness is owing to a loose 'pile' or surface of threads, occasioned by the insertion of short pieces of silk thread doubled under the shoot, weft, or cross threads. These stand upright so thickly as entirely to conceal the interlacing of the warp and shoot. The richness of the velvet depends upon the closeness of the pile-threads. The insertion of these short threads is effected in the following manner:—Instead of having only one row of warp-threads, which will be crossed alternately over and under by the shoot, there are two sets, one of which is to form the regular warp, while the other is to constitute the pile; and these two sets are so arranged in the loom as to be kept separate. The quantity of the pile-thread necessary is very much more than that of the warp-thread; and therefore must be supplied to the loom by a different agency.

If the pile-threads were worked in among the shoot, in the same way as the warp-threads, the fabric would be simply a kind of double silk, but without any kind of pile; the pile-threads are therefore formed into a series of loops, standing up from the surface of the silk; and by subsequently cutting these loops with a sharp instrument, the pile is produced. Thin brass wires are temporarily woven in among the weft-threads, to assist in forming the loops; and by a delicate cut or scission made with a sharp instrument, the loops are cut and the wires liberated. Striped velvets are produced by some of the pile-threads being uncut.

Cotton is now employed, as well as silk, in the manufacture of velvet. The different varieties of fustian are a kind of cotton-velvet.

VENAFRO. [Lavoro, Terra di.]

VENAISSIN, COMTAT. [Comtat-Venaissin.]

VENCE. [Var.]

VENDE'E, a department in France, formed out of Lower Poitou and named from the river Vendée, is bounded N. by Loire-Inférieure, N.E. by Maine-et-Loire, E. by Deux-Sèvres, S. by Charente-Inférieure, and W. by the Atlantic. Its greatest length from N.W. to S.E. is 82 miles; its greatest breadth is 56 miles. The department comprehends the islands of Bouin, Noirmoutier, and D'Yeu. The area is 2632 square miles, and the population is 376,184, which gives 142.92 to the square mile, being 30.83 below the average for the whole of France.

The coast of this department is generally low, and forms, with the islands of Noirmoutier and Ré, the bay of Bourgneuf on the N.W., and the bay of Pertuis Breton on the S. The shore is lined with a broad zone of fens, a large portion of which has been reclaimed by means of dykes and canals, and is of remarkable fertility. The island of *Bouin*, which is insulated by the Dain and united to the mainland by a causeway, is about 7 miles long and about 4 wide. *Noirmoutier*, which protects the bay of Bourgneuf to seaward, is about 12 miles long and 5 broad. It is separated from the mainland at its south-eastern extremity by a narrow channel, which is passable for horses at low water. The coast of the island is lined by sand-hills or by low flat rocks, and shoals extend far out to sea. The soil of the island is very fertile; some of the most productive parts are below the level of the sea, from which they are protected by embankments. The products of the island include grain, pulse, fruit, salt, and good cheese. The oyster fishery is actively carried on; and the inhabitants, who amount to about 8000, are excellent seamen. The isle *D'Yeu*, lies farther out from the mainland, from the nearest part of which it is distant more than 10 miles: it is about 6 miles long and 3 broad. Its western coast is high and inaccessible; the eastern coast is low and flat, affording ready and safe access to small boats. The whole island is a vast granitic rock, covered with a vegetable soil three feet in thickness in the lower part, but in the higher ground so thin as to leave the rock almost bare. About half the land is cultivated; the rest is a mere waste, affording scanty pasturage to a few head of cattle. The inhabitants amount to about 2500, all engaged in fishing. A vast quantity of salt is made by evaporation in the salt marshes along the mainland and in the isle Noirmoutier.

The interior of the department presents two districts, with very marked distinctions, namely, the *Bocage*, which comprises all the north of the department from the Sèvre-Nantaise to the fens; and the *Plain*, which comprises the southern districts, and bears evidence of having once been submerged by the ocean. The Bocage takes its name from the quantity of wood with which it is clothed; not that there are many large woods, but every field is surrounded by a quickset hedge, in which timber trees are thickly planted, so that the country has the appearance of a forest. The Bocage is hilly, especially in the east and north-east, where the Gâtinais hills cross the department from Deux-Sèvres; the soil is poor, and the roads, with few exceptions, bad; here and there are extensive wastes covered with gorse and broom. The Plain, which covers about 300 square miles, is the most fertile district in the department; it has a strong clay soil, resting on limestone; sea shells are found on the surface and to a considerable depth below it. Although called the Plain, it presents considerable inequalities of surface.

The department is drained by a great number of small rivers. The Vendée rises in the forest of Chantemerle in Deux-Sèvres, passes Fontenai and enters the Sèvre-Niortaise above Marans; it is navigable from a little below Fontenai. The Autise, which joins the Sèvre-Niortaise a couple of miles above the mouth of Vendée, is navigable for about 6 miles. The Sèvre-Niortaise is navigable all along the south of the department. The northern and north-eastern parts are drained by the Sèvre-Nantaise and the Boulogne, both tributaries of the Loire. [Se'vres, Deux; Loire-Infe'rieure.] The Lay, which with its affluents drains the central and south-western parts, has been made navigable for about 20 miles above its entrance into the Pertuis Breton. The Vie rises N. of Bourbon-Vendée, and enters the Atlantic below St. Gilles, whence it has a tide navigation

of about 6 miles. The only navigable canal, that of Luçon, has a course of 9 miles from the town of Luçon, into the road of Aiguillon, south of which is a remarkable spit of land, projecting about 3 miles into the sea. The department is crossed by 5 national, 16 departmental, and 11 military roads.

The climate varies with the elevation of the soil. The Bocage being hilly, has a colder temperature than the rest of the department; the air also is purer: the summer very dry, the winter wet. The summer of the Plain and the Fens is hotter and longer; the air of the fens is loaded with moist unhealthy vapours. The prevailing winds are the north and the south; the latter is the more frequent. The changes of temperature on the coast are sudden.

Agriculture is in a backward state. Above 1,000,000 acres of the surface are arable land. Wheat, barley, oats, rye, millet, and buckwheat, are grown; hemp and flax are grown in the Plain, and to a greater extent in the Fens. The grass-lands are extensive, amounting to above 270,000 acres, and the heaths and open pastures exceed 160,000 acres; they are chiefly in the Bocage and the Fens. The breed of horses is small but vigorous; a great number of mules and asses are bred. The cattle are hardy, but not handsome; and the improvement of the breed of sheep is neglected. The vineyards occupy above 40,000 acres, yielding annually about 5,000,000 gallons, chiefly of bad white wine. The woodlands occupy about 60,000 acres. The orchards are extensive; the apple, cherry, and chestnut, are the principal fruits.

The department is divided into three arrondissements, as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Napoléon-Vendée . . .	10	104	135,554
Fontenai . .	9	111	132,633
Les Sables d'Olonne . .	11	79	107,997
Total . .	30	294	376,184

Of the arrondissement of Napoléon-Vendée and of the whole department, the capital is *Napoléon-Vendée*, formerly *Napoléon-Ville*, and *Bourbon-Vendée*. The town, which occupies the site of the old castle and village of *Roche-sur-Yon*, is situated in 46° 40′ N. lat. 1° 25′ W. long., 235 miles S.W. from Paris, on a hill above the little river Yon, and has a college, a tribunal of first instance, and about 7000 inhabitants. It may be said to owe its existence to Napoleon, who chose it to be the site of the capital of the department, and authorised the erection of the necessary public buildings. In the centre of the town, and on the summit of the hill, is the Place Royale, a spacious rectangle bordered with rows of trees, and surrounded by good buildings; into this square the principal streets, which are straight, wide, clean, and well built, open. There are no industrial establishments of importance here; but the number of coffee and public-houses is remarkably great for the size of the town. Many of the streets are still only traced out. The chief buildings are—a handsome parish church; the residence of the mayor, a beautiful structure in the Greek style, and adorned with a peristyle; a market-house, which is a square building, surrounded by a peristyle supported on several steps; a theatre; the prefect's residence; the great barrack; and the hospital. *Chantonnay*, in the centre of a coal-field, 19 miles from Napoléon-Vendée, with a population of 2700; *Les-Essarts*, a wretched village, with 2400 inhabitants, and the remains of a fine old castle, 11 miles from Napoléon-Vendée: *Les-Herbiers*, a well-built thriving town of 3000 inhabitants, situated in a beautiful district, 22 miles from Napoléon-Vendée; and *Poiré* at a little distance from the Vic, population 3543, give name to somes of the other cantons.

Of the arrondissement of Fontenai, the chief town *Fontenai-le-Comte*, situated on the slope of a hill above the left bank of the Vendée, in a narrow plain between the Bocage and the Fens, has a tribunal of first instance, a college, and 7960 inhabitants. The town has a very pretty appearance, and is approached by four fine roads, leading from Nantes, Rochelle, Saumur, and Niort. The streets in the older parts of the town, are narrow and winding, but there is considerable appearance of business in them. The principal buildings are the beautiful gothic church of Notre-Dame, with a spire 266 feet high; the college, which is surrounded by walls and gardens, and has accommodation for 400 boarders; the hospital, the new prison, the theatre, and the pretty fountain, whence the town has its name, near the ruins of the old castle of the Counts of Poitiers. The trade of Fontenai in corn, timber, seeds, oak staves, coals, charcoal, provisions, and Bordeaux wines, for which Fontenai is an entrepôt, is greatly facilitated by the navigation of the Vendée. The only manufactures are linen and coarse woollen stuffs. The Republicans were defeated here by the Vendeans under Larochejacquelin, Lescure, and Bonchamps, May 24, 1793. *Chaillé-les-Marais* on the Rochelle Road, in the middle of the Fens, has 2296 inhabitants. *St. Hilaire-des-Loges*, a large village situated on the Autise, has a population of 2690. *Luçon*, a gloomy and not very clean town, situated on the eastern edge of the Fens, and at the extremity of the Luçon canal, (which is navigable for vessels of 60 tons) gives title to a bishop, and has a diocesan seminary and 4300 inhabitants, who trade in corn, beans, timber, oak staves, hoops, coarse pottery, wine, &c. The Vendéans were defeated here by the republicans, June 28 and Oct. 1, 1793. *Pouzauges*, a pretty little town N. of Fontenai on the western slope of the Gâtine hills, has a handsome church, a Protestant temple lately erected, and 2300 inhabitants.

The arrondissement of Les-Sables-d'Olonne, takes its name from its chief town *Les-Sables*, which is situated on a peninsula on the coast, and consists of several long, clean, and well-paved streets. The southern part of the town stands on a slight eminence; the suburb La-Chaume, built on a level rock, is separated from the town

by a canal. None of the buildings are remarkable, but the town is important on account of its harbour, which admits vessels of 200 tons; and works are in progress for the formation of wet docks and for deepening the channel. The entrance of the port is defended by batteries, and the town itself is slightly fortified. Les-Sables has a light-house, a tribunal of first instance, a college, a school of hydrography, and 5562 inhabitants. Corn, wine, salt, pitch and tar, fresh and salt fish, are the chief articles of trade. Ships are built and fitted out for the Newfoundland fisheries: the coast fisheries are actively plied. *Beauvoir*, formerly washed by the sea, and hence surnamed *sur-Mer*, situated opposite the isle of Noirmoutier, has a harbour for vessels of 80 tons, which reach the town by a canal, and 2400 inhabitants, who trade in salt, corn, and timber. *Challons*, situated in the Fens N. of Les-Sables and near the Perier canal, has a population of 3843. *St. Jean-de-Mont*, a large village near the coast N. of Les-Sables, has a population of 3680. *Noirmoutier*, a small seaport in the isle of Noirmoutier, has 2400 inhabitants, who trade in corn, salt, beans, soda, and fish. *Talmont*, situated on a hill near the coast, and close to the great salt marshes, has 3123 inhabitants.

The department forms the see of the bishop of Luçon; it is comprised in the jurisdiction of the High Court of Poitiers, and in the 14th military division, of which Nantes is head-quarters. Under the late monarchy it returned 5 members to the Chamber of Deputies; it now has 8 representatives in the Legislative Assembly of the republic.

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VENDÔME. [Loir-et-Cher.]

VENDOR AND PURCHASER. Contracts for the sale and purchase of land or other real estate may be entered into either privately between the parties, or upon a sale by auction. At common law, agreements for the purchase of real estates might be made by parol, but by the Statute of Frauds (29 Car. II., c. 3, ss. 1, 2, 3, and 4), 'All leases, estates, interests of freeholds, or terms of years, or any uncertain interest of, in, or out of any messuages, manors, lands, tenements, or hereditaments, made and created by livery and seisin only, or by parol only, and not put in writing by the parties so making or creating the same, or their agents thereunto lawfully authorised by writing, shall have the effect of leases or estates at will, any consideration for making any such parol leases or estates notwithstanding.' But leases not exceeding three years, whereupon the rent reserved should amount to two-thirds of the full improved value, were excepted. The act requires the assignment, grant, and surrender of existing interests to be in writing, and enacts that 'no action shall be brought whereby to charge any person upon any agreement made upon any contract or sale of lands, tenements, or hereditaments, or any interest in or concerning them, unless the agreement upon which such action shall be brought, or some memorandum or note thereof, shall be in writing, and signed by the party to be charged therewith, or some other person thereunto by him lawfully authorised.' The note or memorandum of agreement may be any writing, such as a letter.

Upon sales of estates by public auction, the highest bidder, upon being declared the purchaser, is considered to have entered into a contract for purchase according to the particulars and subject to the conditions of sale; and the auctioneer, who is for this purpose considered as the agent of both vendor and purchaser, is thereupon authorised to sign an agreement of purchase. The writing down the purchaser's name upon any memorandum of sale at the time of the bidding is a sufficient signing. Sales by auction of lands are within the above-mentioned enactments of the Statute of Frauds; but sales before a master under a decree of a court of equity will be carried into execution, although the purchaser did not subscribe any agreement; for the judgment of the court in confirming the purchase takes it out of the statute. An auction duty of 7*d.* in the pound was formerly payable upon all sales by auction of any interest in freehold, copyhold, or leasehold lands, tenements, houses, or hereditaments; but it was abolished by the 8 Vic., c. 15. The subject of the sale and purchase of estates is discussed at length in Sugden's 'Treatise on the Law of Vendors and Purchasers of Estates.'

VENEERING is the art of laying thin leaves, called *Veneers*, of a valuable kind of wood upon a ground or foundation of inferior material, so as to produce articles of elegant appearance at smaller cost than if they were composed entirely of the ornamental wood. Small veneers are cut by hand with a thin saw, the block being held firmly in a vice; but large ones are usually cut by machinery. They are carefully brought to the right thickness by fine planes; cut precisely to the required shape; and then glued down to the ground, which should be of dry wood, with strong glue. Precautions are taken to prevent the veneer from springing or loosening before the glue is dry. The work is afterwards finished with very fine planes and scrapers, and polished with fish-skin, wax, and a brush or polisher of shavegrass.

VENE'RIDÆ, a family of *Conchacea*. Lamarck divides this group into two sections, viz. 1, *Conques Fluviatiles* (genera, *Cyclas, Cyrena, Galathea*); 2, *Conques Marines* (genera, *Cyprina, Cytherea, Venus, Venericardia*).

Mr. J. E. Gray places the *Veneridæ* as the first family of his order *Phyllopoda*, with the following genera:—*Artemis, Cytherea, Meroe, Gratelupia, Trigona, Chione, Circe, Dosina, Mercenaria, Anomalocardia, Cypreria, Venus, Tapes, Venerupis*, and *Clementia*.

The *Veneridæ* are immediately followed in Mr. Gray's arrangement by the *Cyrenidæ*, which comprise the genera *Cyrena, Geloina, Velorita, Cyclas*, and *Pisidium*.

The *Cardiadæ* immediately follow. ('Synopsis Mus. Brit.,' 1842.) Our limits will only permit the notice of a few leading genera.

1. *Cyrena*.—Example, *Cyrena fuscata*. Locality, the Chinese rivers and those of the Levant.

2. *Megadesma.*—Example, *Megadesma radiatum* (*Galathea radiata*, Lamarck, *Potamophila radiata*, Sowerby). Locality, the rivers of Ceylon and India.

3. *Cyprina.*—Example, *Cyprina islandica.* Locality, Northern Ocean, at the mouths of rivers.

4. *Cytherea.*—Example, *Cytherea Dione.* Locality, the seas of America.

5. *Venus.*—Example, *Venus cancellata.* Locality, the seas of America.

6. *Venerupis.* [LITHOPHAGIDÆ.]

7. *Lucina.*—Example, *Lucina Jamaicensis.* Locality, the West Indian seas.

VÉNETI. [MORBIHAN.]

VENETIAN SCHOOL OF PAINTING. The historians of Venetian art date the commencement of modern painting in Venice from the 11th century, or about 1070, when the Doge Selvo invited some Greek mosaic-workers to Venice to adorn the church of St. Mark; and in the 13th century, after the taking of Constantinople by the Venetians, in 1204, not only works of art, but artists also, are said to have been plentiful in Venice, Venetians as well as Greeks. Only two however of the former can now be named, Giovanni da Venezia and Martinello da Murano.

It was not until after the time of Giotto that the painters of the Venetian states began to distinguish themselves. The oldest known works at Padua are by painters of the school of Giotto. The paintings in the church of San Giovanni Battista at Padua are attributed to Giusto Padovano, a scholar of Giotto and a Florentine by birth, though naturalised at Padua. Guariento of Padua was also a follower of Giotto, and was celebrated about 1360: some of his works are still remaining. There were some painters about this time in Venice and Treviso who painted in what may be termed a national style; and among these may be included the miniature-painters, who were then numerous.

In the 15th century a very different style prevailed; and although the artists of this period still designed with great stiffness and in the gothic taste, they produced many admirably-coloured pictures as regards the brilliancy and composition of colour, but in the local colours and reflexes they were yet deficient. The leaders of the improved style were some painters of the small island of Murano, and it has the glory of having been the nursery of the greatest painters of Venice: Titian studied at Murano. The first painters of this place were Quirico, Bernardino, and Andrea da Murano; but its great ornaments were the Vivarini. The principal contemporaries and rivals of the Vivarini in Venice were Jacopo Nerito of Padua and Nasocchio di Bassano the elder, both scholars of Gentile da Fabriano, who was employed in Venice in the beginning of the 15th century; also Jacopo Bellini, Francesco del Fiore and his son Jacobello del Fiore, and Morazone; and Donato and Carlo Crivelli, scholars of Jacobello del Fiore.

Besides the painters already mentioned, there were others of equal merit in other parts of the state, in Bergamo and Brescia. The greatest master however of this period was Francesco Squarcione of Padua, who formed there the greatest school of painters ever brought together by one man. There is only one work at Padua known to have been done by Squarcione, painted for the Lazara family in 1452: it is excellent in colouring, in expression, and in perspective. Mantegna, Marco Zoppo, and Jacopo Bellini, were scholars of Squarcione.

Towards the end of the 15th century, about 1470, a great change took place in the Venetian method of colouring. The old methods of painting in distemper (à tempera), and with gums, &c. (à guazzo), were laid aside for what is now generally called oil painting. This method was introduced into Venice by Antonello da Messina, who had learnt it in Flanders of John van Eyck. Roger of Bruges, likewise a scholar of Van Eyck, is said also to have visited Venice. The first Venetians who distinguished themselves in the new method were the Vivarini and the Bellini. Giovanni Bellini acquired the reputation of the most distinguished painter of his time in Venice: he painted from 1464 until 1516.

Whilst the artists of the neighbouring cities of Venice were with more or less success contentedly following the dry manner of Bellini, it was completely exploded at Venice itself by two of his own scholars, Giorgione and Titian. [GIORGIONE; VECELLIO.] The following celebrated masters were among the scholars of Giorgione: Sebastiano del Piombo, Giovanni da Udine, Francesco Torbido, called Il Moro, Pietro Luzzo, and Lorenzo Luzzo. The imitators of Titian were likewise numerous, but his scholars are very few. Two of his most celebrated followers were Girolamo di Tiziano and Bonifazio of Verona, though called Veneziano by Vasari and others. To enumerate the followers of Titian, or Giorgione, or those who imitated the characteristics of their styles, would be to enumerate nearly all the painters of Venice of this period, besides many of those of the neighbouring cities.

It remains yet to mention three of the greatest ornaments of the golden age of Venetian painting, as this period is called. [BASSANO; CAGLIARI; TINTORETTO.] Cagliari, or Paolo Veronese, as he was called, was the real master of Rubens. Verona had at this time three other painters little inferior to Paolo himself: Battista d'Angelo, called Del Moro, scholar and son-in-law of Torbido; Domenico Ricci, called Brusasorci; and Paolo Farinato, called degli Uberti. Of the assistants and scholars of Paolo the most distinguished were his brother Benedetto Cagliari, who generally painted his architecture for him; his son Carlo Cagliari, called Carletto, who died young; Gabriele Cagliari, likewise his son; and Battista Zelotti, the most distinguished of all his followers.

After the time of the great masters just spoken of, in the 17th century, the Venetian school of painting declined as much and as rapidly as the Florentine did after the time of Michel Angelo. Many of the Venetians of this period, mistaking apparently brilliancy for art, cultivated little besides colour, and many of their pictures are mere compositions of silks, satins, and other stuffs.

Jacopo Palma the younger (born 1544, died about 1628) holds a middle place between the great painters of the last period and the mannerists of this. Lanzi calls him the last of the good age and the first of the bad. In 1630 and 1631 many painters were carried off by the plague, which visited Venice in those years; and traces of the excellencies of the great masters were after that time still more rare in the works of the surviving painters of Venice. In the middle of the 17th century the style of M. A. Caravaggio and the Naturalisti began to prevail there, and several foreigners supplanted the Venetian painters in public estimation in Venice itself. [CARAVAGGIO.] Of these Naturalisti and Tenebrosi, Pietro Ricchi of Lucca, called Il Lucchese, was one of the best.

At the end of the 17th century no particular style prevailed in Venice, and all the various classes of painting had their votaries: landscape, architecture, battle, and marine painters, were alike numerous. Giambattista Tiepolo was the last of the Venetians who in the 17th century acquired a great name. [TIEPOLO.]

One of the greatest painters of the 18th century, who, though he was not a Venetian, was first educated at Venice by Cervelli, was Sebastiano Ricci, or Rizzi. [RICCI.] Ricci had several celebrated scholars. Among the other painters of the Venetian state, in the 18th century, the following were the most distinguished:—Antonio Zifrondi of Bergamo was a painter of remarkable facility of execution; and Fra Vittore Ghirlandi and Bartolomeo Nazzari, of the same place, were both excellent portrait painters. In Brescia Avogadro Bresciano was distinguished for rich colour, elegant composition, and good drawing; likewise Andrea Toresani. Simone Brentana, though a native of Venice, was domiciliated at Verona, and painted many excellent works there. Of Verona also was Antonio Balestra. The last of the distinguished painters of Verona was Gio. Bettino Cignaroli.

Santo Prunati of Verona, contemporary with Balestra at Verona, was also a good painter; and there was a Pietro Uberti at Venice, an excellent portrait painter. A very distinguished painter also of this period at Venice was Antonio Canaletto, known throughout Europe for his views in Venice, and other cities in and out of Italy. [CANALETTO.]

VENEZIA. [VENICE.]

VENEZIA'NO, ANTO'NIO, was born, according to Vasari, at Venice, about 1309, but Baldinucci believes him to have been a Florentine. He studied with Angelo Gaddi at Florence. At Pisa he completed the series of the life of San Ranieri, in the Campo Santo, which had been commenced by Simone Memmi. Vasari considers the frescoes of Veneziano in the Campo Santo at Pisa to be the best paintings there. Most of his other works have perished. Late in life he turned physician, and died of the plague at Florence, in 1384, the victim of his desire to save others.

VENEZIA'NO, DOME'NICO, born at Venice, about 1406, acquired the art of painting in oil from Antonello of Messina, obtained a good reputation in several parts of Italy, particularly in Perugia, and was invited to Florence, where he was employed in various places, and also, together with Andrea del Castagno, to paint a chapel in Santa Maria Nuova. Domenico died in 1482. It has been said that he was killed in a most treacherous manner by Castagno, who envied his rival's superior reputation; but this statement rests only on a reported death-bed confession of Castagno himself. Domenico's works in the church of Santa Maria Nuova were never completed, and they have long since been destroyed, but there is still a picture by him in Santa Lucia de' Magnoli. He excelled in colouring and in perspective.

VENEZIA'NO, AGOSTI'NO, was born near the close of the 15th century at Venice. His family name was probably Muzi, and he took the Latin name of Augustinus Venetus de Musis. He derived his surname from the place of his birth. He was taught engraving by Marcantonio Raimondi, for whom, in conjunction with Marco de Ravenna, he engraved many works at Rome, chiefly after Raphael: he remained with Marcantonio until the death of Raphael, in 1520, when he worked for himself. There are prints marked with Agostino's initials, A. V., bearing dates from 1509 to 1536; they are executed much in the style of the prints of Marcantonio, but are very inferior in design and in chiaroscuro. The large print of the Skeletons or Burying-place, after Baccio Bandinelli, is Agostino's masterpiece. There is in the British Museum a very good collection of his works.

VENEZUE'LA, a republic in South America, extending over the northern portion of that continent, is situated between 1° 8′ and 12° 16′ N. lat., and between 58° 16′ and 71° 24′ W. long. It is bounded N. by the Caribbean Sea, W. by New Granada, S. by Brazil, and E. by Brazil, English Guiana, and the Atlantic Ocean. The boundaries are very irregular, and some of them not definitively settled. The area has been estimated at about 400,000 square miles. The population in 1841 was estimated at about 1,050,000.

Sea-coast.—The Boca de Navios, or principal mouth of the river Orinoco, may be considered as the most eastern point of the sea-coast of Venezuela. From that point the coast extends W.N.W. to the innermost recess of the Gulf of Paria, a distance rather exceeding 200 miles. The whole of this tract is very low, and a part of it is covered by the sea at high-water. The Peninsula of Paria, which divides the Gulf of Paria from the Caribbean Sea, is occupied by a ridge of high rocks. Another rocky peninsula extends westward as far as the town of Cumaná, between which and Barcelona the coast, about 72 miles, is of moderate elevation. From Barcelona to Cape Codera, which are about 128 miles distant from one another, the shores are low and sandy. The coast between Cape Codera and Puerto Cabello, about 155 miles, is very high. From Puerto Cabello to La Vela de Coro is 165 miles, generally low and sandy. The coast-lines round the Peninsula of Paraguana, and those of the isthmus which connects it with the mainland, are about 180 miles. Farther west, as far as the limits of Venezuela, the coast is mostly low, sandy, and

in some places covered with swamps or lagoons. The whole coast-line of the republic is about 1580 miles.

Surface and Soil.—Venezuela contains three distinct mountain-regions, extending respectively over the N.W., the N.E., and the S.E. The N.W. parts are occupied by the Andes, and the mountains of the coast, which are connected with the Andes; the N.E. districts are mostly covered by the ranges of the Sierra de Bergantin; and the S.E. region comprehends the western portion of the Sierra de Parima. These mountain-regions are separated from one another by plains. The mountain-regions occupy about 90,000 square miles, whilst the plains extend over about 310,000 square miles.

The mountain-region of the Andes is a continuation of the most northern portion of the eastern Andes of New Granada. The Andes form an enormous mass of rocks, occupying with its declivities a mean width of more than 60 miles, and its length is nearly 330 miles. The highest portion of this range is generally a narrow table-land, but so elevated that no trees or bushes are found on it, but only a few hardy alpine plants. These table-lands, called paramos, are from 10,000 to 12,000 feet above the sea-level, and there are several summits above 14,000 feet high. Cultivation has advanced to an elevation of from 8000 to 9000 feet. Between the Sierra de Perijá and the Andes lies the basin of the lake of Maracaibo. This lake, the largest in South America, is 92 miles long, and the channel by which it is connected with the Caribbean Sea is 46 miles, so that the whole lake extends 138 miles from south to north. The greatest width is 82 miles.

The Coast-Range (Sierra Costanera) begins where the Andes terminate on the left bank of the Cojedes, an affluent of the Portuguesa. The mountains themselves do not constitute a large mass of rocks, but divide into several ridges, and their elevation sinks to nearly half the height of the mountains south of the Cojedes. Between this high ground and the sea on the north, is a tolerably level tract, several miles wide, but on the east along the shores of the Golfo Triste the hills come close up to the sea at several places. The Peninsula of Paraguana is an appendage to the region of the mountains of Coro, being united to it by a narrow isthmus. The eastern portion of the coast-range is composed of two well-marked ridges, and one which is frequently interrupted. The country, enclosed by the two parallel ridges, contains the Lake of Tacarigua, which extends from W. to E. about 30 miles, and from N. to S. 13 in the widest part. It has no outlet. The shores of this lake are very fertile.

The mountain-region called Sierra del Bergantin, which occupies the north-eastern portion of the republic, is of comparatively small extent. Its length is about 180 miles, but its width varies between 50 and 10 miles.

South of the mountain-regions hitherto mentioned lie the Llanos, or Plains, which lie between the Orinoco and the Andes, and cover an area which has been estimated at 116,600 square miles. This tract, though one immense plain, presents a great variety in elevation, climate, rivers, and productive powers. Some tracts are hardly elevated above the sea, whilst others rise to nearly 1300 feet; some are arid deserts, while the vegetation of others is extremely vigorous nearly all through the year. The whole however is characterised by a want of forests. Farther W. are the table-lands, or Mesas, which constitute a peculiar feature in this part of Venezuela. The surface is quite level, and the soil consists chiefly of sand. This soil is unproductive, and the rains do not fertilise the ground, but give origin to a hundred rivers, which run S. to the Orinoco, E. to the Gulf of Paria, and N. to the Caribbean Sea. The country between the table-land and the Caribbean Sea extends about 60 miles from N. to S., and is a level plain, fit only for pasture. The most uneven portion of the plains is that which extends on the south side of the coast-range, and lies west of the river Orituco, reaching to the banks of the Portuguesa. S.W. of this uneven tract are the Plains of Barínas (Varinas), which are considered the most fertile part of the great plain, and the best adapted for cultivation. These plains extend along the base of the Andes from the Rio Portuguesa to the Rio Sarare and Apure, a distance of more than 150 miles, and are from 60 to 80 miles wide. Between the Rio Apure and the Rio Meta, both affluents of the Orinoco from the west, are the Llanos of Apure, the lowest portion of the great plains. In the dry season this plain is one immense pasture-ground; but after the rains the whole plain is an immense lake, in which the banks appear like islands.

South of the Rio Meta begins a woody region, which extends southward to the limits of Brazil, and may be considered as the northern portion of that immense forest which occupies South America on both sides of the equator. It is very imperfectly known, except along the banks of the Orinoco.

That portion of Venezuela which lies east of the Rio Orinoco and north of the Pacaraima ridge, is mostly occupied by the Parime Mountains and their offsets. The greater part of this immense tract is almost entirely unknown, as the interior has been traversed only by a few adventurers, who followed the course of the large rivers in search of the famous El Dorado. They found nearly the whole covered with an interminable forest of tall trees.

Rivers.—Venezuela is well watered, with the exception of the Mesas and that tract of the coast which extends from the town of Cumarebo westward to the Gulf of Venezuela. The number of rivers is very great, and that of the navigable rivers considerable. The greater part of them join the Orinoco, which, with its chief tributaries, is noticed elsewhere. [Orinoco.] The southern portion of Venezuela is drained by the Rio Negro, which in its upper course is called Guainía. It is joined from the north by the Casiquiare, a branch of the Orinoco, which connects the Rio Orinoco with the Rio Amazonas. This natural channel is 248 miles long, in general 30 feet deep, and on

the average about 400 yards wide. The rivers which fall into the sea within the territory of the republic without joining the Orinoco, Rio Negro, or Essequibo, have a comparatively short course. The Guarapiche rises in the mountain-system of the Bergantin, and falls into the Gulf of Paria. It runs about 180 miles, of which more than 70 are navigable. The Neveri, on which the town of Barcelona is built, rises in Mount Turumiquire, runs about 60 miles, and is navigable for small boats for 40 miles. The Unare, rising in the Mesas, flows about 170 miles, and is navigable for 90 miles. The Tui, which drains the principal valley of the coast-range, flows 190 miles, and is navigable for more than 80 miles. The Tocuyo rises on the northern declivity of the Paramos of Niguitao and of Rosas, and falls into the Golfo Triste after a course of 330 miles, of which more than 150 are navigable.

Climate and Productions.—With respect to climate, Venezuela is divided by the natives into three zones, called Tierras Calidas, Tierras Templadas, and Tierras Frias. The Tierras Calidas (hot countries) are all those which do not rise more than 2000 feet above the sea, and in which only tropical plants and fruits succeed. The Tierras Templadas (temperate countries) are between 2000 and 7000 feet above the sea: the agricultural productions of Europe succeed best in them. The Tierras Frias (cold countries) are those which, from 7000 feet above the sea-level, rise to the summit of the Sierra Nevada de Merida (15,348 feet), 148 feet above the snow-line. In Venezuela, as in other countries between the tropics, the year is divided into two seasons, the wet season and the dry season. The wet season is called the winter, though the heat is then greatest, as the sun passes twice over the zenith; whilst during the dry season, which is called the summer, the sun is in the southern hemisphere. The north-east trade-wind, which properly blows the whole year round in this country, is modified in its direction and force by these seasons.

The articles of cultivation which are grown for exportation are cotton, indigo, cacao, coffee, sugar, tobacco, and cocoa-nuts. Indigo, which was once the most important object of cultivation, is much neglected, and cotton, coffee, and sugar have taken its place; but indigo is still grown in some places within the coast-range. The cocoa-palm is met with to the height of 700 feet, and yields valuable articles of export. The tobacco is of the best quality, and includes the well-known Varinas. Maize is extensively cultivated all over the country, but wheat only in the more elevated tracts, especially in those which are more than 1800 feet above the sea-level. Rice is grown in a few places in the lower tracts, and barley only on the declivity of the Andes. Millet is also an object of cultivation.

The domestic animals constitute one of the principal branches of the wealth of Venezuela. The large plains supply pasture for cattle, horses, mules, and asses, and the number of these animals is very great. It is also considerable in the other districts, as the greater part of the country is uncultivated. Sheep and goats are also generally kept, but are only numerous in one or two districts. Pigs abound in the valleys of the mountain-ranges and the countries contiguous to them.

The principal wild animals include the jaguar, puma, ounce, tiger-cat, monkey, tapir, capybara, porcupine, wild-hog, sloth, and ant-eater. The birds are numerous, especially those belonging to the falconidæ, ardeidæ, strigidæ, and psittacidæ. There are also pelicans, wild geese and ducks, and flamingoes. The alligator abounds in the Orinoco, Apure, and Portuguesa, and is also found in several other rivers. The iguana is eaten, and considered a dainty. There are boa-constrictors and several venomous snakes.

Venezuela is not rich in minerals. Gold is found in several places, and a valuable mine has recently been discovered in the mountains south of the Orinoco. Silver, tin, copper, iron, and lead occur; but only the copper ore is worked profitably. Coal, natron, salt, and petroleum, are found in different places.

Inhabitants.—The population consists of aborigines, of the Spaniards and Africans who have settled in the country, and of the offspring which has resulted from the mixture of these three nations. The aborigines are generally copper-coloured, some being very dark, whilst others are almost as fair as Europeans. The greater part of them cultivate cotton, plantains, yucca, batatas, and even the sugar-cane, or at least some of these articles. They live in houses, but all of them go nearly naked. The population has been distributed as follows:—

Whites . . .	298,000
Negroes . . .	48,000
Indians . . .	226,000
Mixed . . .	480,000
	1,052,000

The laws of the republic forbid the importation of slaves; and by a law of the republic of Columbia, made in 1821, which was ratified by the legislature of Venezuela in 1830, the offspring of slaves are to be free, so that after some years slavery will be extinct in this country.

Political Divisions and Towns.—After the republic of Columbia had been dissolved (1830), that of Venezuela was divided into 13 provinces, 88 cantons, and 523 parishes. Twelve provinces are on the continent, and the thirteenth is the island of Margarita.

1. *The Province of Maracaibo* contains the town of *Maracaibo*, built on the western shores of the strait which connects the great lake with the Gulf of Maracaibo. There are some good buildings, but the greater part of the houses are of wood and thatched. The town has a considerable trade, as it is the harbour of the provinces of Merida and Trujillo, and also of several districts of New Granada. The inhabitants, about 14,000, are owners of many small trading vessels.

2. *The Province of Coro* contains the town of *Coro*, which has a population of 4000. It carries on a little trade with the Dutch island of Curaçao.

3. *The Province of Barquicimeto* is rich both in vegetable produce and in mines. It contains the town of *Barquicimeto* [BARQUICIMETO];

Tocuyo, which has a population of about 10,000; and *San Felipe*, a well-built town, with about 7000 inhabitants.

4. *The Province of Trujillo* contains the town of *Trujillo*, which has a population of about 4000.

5. *The Province of Merida* comprehends much of the mountain-region of the Andes. Its chief town, *Merida*, has 6000 inhabitants.

6. *The Province of Barínas* contains the town of *Barínas*, or *Varinas*. [VARINAS.]

7. *The Province of Carabobo* contains the prosperous town of *Valencia*, the position of which is important for commerce, as all the products of the provinces of Barinas and Barquicimeto pass through the town to Puerto-Cabello. The town is well built and contains 16,000 inhabitants. The best harbour of the republic, PUERTO CABELLO, belongs to this province.

8. *The Province of Caracas* is very large. The chief town, *Caracas*, is the capital of the republic. [CARACAS.]

9. *The Province of Barcelona* contains no town of importance except the capital. [BARCELONA.]

10. *The Province of Cumaná* unites the advantages of a fertile soil, an extensive coast-line, and the neighbourhood of foreign settlements. Its articles of commerce are exported from five ports, Cumaná, Carúpano, Güiria, Rio Caribe, and Maturin.

11. *The Province of Guayana*, the largest of the republic, is thinly inhabited. All the commerce is concentrated in the town of *Guayana*, or *Angostura*. [ANGOSTURA.]

12. *The Province of Apure* contains the small towns of *Achaguas* and *San Fernando de Apure*.

13. *The Island of Margarita* is in the Caribbean Sea, outside the peninsula of Araya, which extends W. as far as the town of Cumaná. It is somewhat more than 40 miles long from W. to E. and 20 miles wide in the widest part. The capital, *Asuncion*, contains about 3000 inhabitants.

Manufactures and Commerce.—The few manufactures of this country are in the Sierra Nirgua and on the declivities of the Andes, at Tocuyo, Barquicimeto, Trujillo, and Merida, where straw-hats, hammocks, coarse cotton-cloth, some worsted stuffs, and earthenware, are made. The commerce of Venezuela diminished greatly during the war of independence, but it has since recovered. Customs duties are laid on the importation of hardware, cottons, woollens, silks, linens, and about forty miscellaneous articles. The income and the expenditure of the republic for 1846 were each about 2,000,000 dollars.

History.—The most eastern part of the coast, and the island of Margarita, were discovered by Christopher Columbus in his third voyage, 1498, and the following year the whole northern coast of South America, from the Gulf of Paria to Cape de la Vela, in New Granada, was discovered by Ojeda and Vespucci. The first settlements on the continent were at Cumaná, which was built in 1520, and at Coro, built in 1527. In 1634 the Dutch took possession of the island of Curaçao. In 1731 Venezuela, which up to that time had formed a part of New Granada, was separated from that country and received a captain-general. It remained under the sway of Spain till 1808, when Napoleon, having deposed the royal family, made his brother Joseph king of Spain. Venezuela, like all the American colonies of Spain, declared for the ancient dynasty, but being dissatisfied with the measures of the regency of Spain, it proclaimed its independence in 1810. In 1812 however it was brought back again to its former political condition. In 1813 Bolivar began his struggles for the liberation of his native country from the yoke of Spain. [BOLIVAR.] After the Spaniards were defeated, New Granada and Quito united with Venezuela, and formed one republic under the name of Columbia. [COLUMBIA.] This union was effected by the deputies of the three countries in 1821; but in 1830 they separated amicably, and since that time they have constituted the three republics of Venezuela, New Granada, and Ecuador. In the year in which the union was dissolved, Venezuela formed a new constitution, which underwent further modification in 1843. Spain formally recognised the independence of Venezuela in 1845. In 1846 a war broke out between the white and coloured population, which did not cease till 1849.

VENICE, REPUBLIC OF, a state politically extinct within our own times, but which figured for more than a thousand years among the independent states of Europe, and acted a considerable part in modern history.

The continental territory of Venice in Italy was much more extensive than what is now called the Venetian States. It included the three provinces of Brescia, Bergamo, and Crema, and the peninsula of Istria. These provinces were detached from Venice by Bonaparte in 1797, when he annexed Bergamo, Brescia, and Crema to the Cisalpine or Italian Republic, and gave the rest of the Venetian territories to Austria. In 1810, after having retaken the whole Venetian territory from Austria and united it to the new Kingdom of Italy, he detached Istria from it, and joined it to Dalmatia and Croatia, to form the separate government of the Illyrian Provinces. At the restoration of 1814 these administrative arrangements were maintained, and the division of the newly-constituted Lombardo-Venetian Kingdom under Austria, which retained the name of Venetian States, was made to embrace only the old Venetian provinces; Brescia, Bergamo, and Crema remaining attached to the Lombard division. [LOMBARDO-VENETIAN KINGDOM.] Istria was made a part of the kingdom of Illyria, likewise subject to the crown of Austria.

History.—Venice was in its origin a city of refuge. The first inhabitants were fugitive citizens of various towns of the neighbouring continent, who, scared by the devastations of the Goths and other northern tribes in the early part of the fifth century of our æra, took refuge in various small islets and strips of land which rise just above high-water, in the midst of the lagunes or shallow seas that extend from the mouth of the Adige to that of the Piave. The lagunes are separated from the open sea by a natural dyke or strip of land, through which are several channels for the passage of ships.

The number of the inhabitants of the lagunes gradually increased, a form of government was established, and in 697 a chief magistrate called the *Dux* or *Doge* was appointed. In the year 809 the seat of government was fixed on the island of Rialto, which, with the cluster of sixty or seventy islands around it, being gradually built upon and joined by bridges, became the city of Venice, though the town for a long time continued to be called Rialto.

About the middle of the ninth century the Saracens made their appearance in the Adriatic, and the Venetians began to encounter at sea this new enemy. Their success against the Saracens was great. By the year 1000 the Venetians had acquired great political and commercial power throughout the Adriatic.

At the epoch of the first Crusade Venetian vessels were employed from the first as transports to carry provisions to the coast of Syria. But afterwards, while the Crusaders were engaged in military operations in Palestine, the Venetians sent a large armament on their own account. During the 12th century they were involved successively in wars with the Pisans, the Hungarians, the Saracens in Palestine, and the Byzantines. Enrico Dandolo, the Doge, was assassinated in 1172, whereupon occurred a great and lasting change in the Venetian government. The frequent popular tumults, the assassinations of many doges, the summary mode of electing and deposing those magistrates by popular acclamation, and the disorders that accompanied these violent movements, made all those who had property (and they were then a very numerous class) wish for a system of government that might ensure order and security. It was then agreed upon by the principal citizens to effect an organic change in the constitution of the republic. A council of nearly 500, annually chosen, were appointed by twelve electors, themselves chosen by the districts; and the doge was to be by right president of the great council. The mode of electing the doge was strictly defined; and the whole of the legislative system was improved. Sebastiano Ziani was the first doge elected after these changes. The republic prospered under his government; and it was at this time that the Pope granted to the doge the symbolic privilege of 'marrying the Adriatic.'

The Venetian navy, together with that of Pisa, shared in the third Crusade; but the Venetians acted a much more important part in the fourth Crusade, A.D. 1203. The Crusaders assembled at Venice, and borrowed the vessels of the Venetians to carry them to the East; the return for which was, that the Crusaders assisted the Venetians in a war against Constantinople, which resulted in a very large increase of power and territory to Venice. In the 13th century Venice was involved in wars with Genoa, which lasted nearly fifty years. At the close of the 13th century and the beginning of the 14th, further changes were made in the mode of electing the doge; and a new constitution was framed. In the year 1311 a court which had been instituted for the trial of certain conspiracies against the state was confirmed for five years as a supreme court for similar offences; and it was afterwards perpetuated till the latest period of the republic by the name of the Council of Ten. The members were renewed yearly by the Great Council. Its proceedings were secret, and its sentences were executed in secret.

In 1315 a book was opened by the name of Libro d'Oro, or the golden book, which was kept in the custody of the Council of Forty, and in which all those who were entitled by the preceding decrees to be candidates for seats in the Great Council were to have their names inscribed by the secretaries, as soon as they attained the age of eighteen. This book became the register of the whole class of the patricians or nobles of Venice, who alone constituted the political body; and thus was established an aristocratic form of government which continued till the end of the republic.

After the death of Gian Galeazzo Visconti, duke of Milan, in 1404, his dominions were attacked by his neighbours, who had been alarmed by his ambition. The result, after many conflicts, was a great addition to the continental power of Venice. In the course of a few years Venice established her dominion over a large part of north Italy, from the Julian Alps to the Adige and the Mincio. These were afterwards styled 'the old Venetian Terra Ferma.' The administration of the Doge Tommaso Mocenigo, 1413–23, was perhaps the most prosperous period in the history of Venice. The republic possessed Candia, Eubœa, the Morea, several of the Ionian Islands, numerous islands in the Archipelago; Dalmatia, and part of Albania; Istria, and the newly-acquired Terra Ferma. It had factories all over the Levant, in Egypt, at Constantinople, and carried on the greatest part of the traffic between Europe and Asia.

About the middle of the 15th century Venice became involved in wars with the Turks, who had acquired possession of the Byzantine Empire. In the course of these wars the Venetians lost Nauplia and their other remaining strongholds in the Morea, and all the islands of the Archipelago, Candia excepted. They afterwards lost Cyprus.

In various wars with the Turks during the 17th century the Venetians lost Candia, but reconquered the Morea and Ægina. The Turks afterwards reconquered the Morea; and by the treaty of Passarowitz (1718), the contention of the Turks and Venetians was put an end to.

Venice abstained during the whole of the 18th century from taking any part in the wars which disturbed Italy. But during this long period of peace she was hastening to decay; the passage to India by the Cape of Good Hope had been discovered; her former spirit was fled; and her commerce had passed into other hands. The population of the entire Venetian territories in 1789 was 2,844,212, of which the city of Venice contained 139,095.

When the French revolutionary armies began to threaten Italy on the side of Piedmont, the Venetian government was invited by the Emperor of Germany and his allies to join the coalition against France. The Venetians determined on a strict unarmed neutrality. During

the subsequent contests between the French and the Austrians, Venice offended both parties in turns by its neutrality; and Bonaparte on certain pretexts entered the Venetian territories. On June 1, 1796, the French entered Verona. They afterwards entered Legnago, Bergamo, Crema, and any other Venetian town, whether fortified or not, which suited their purpose, demanding at the same time provisions, carts, horses, &c. The French troops lived upon and at the expense of the Venetian States for nearly a twelvemonth. The fate of the Venetian republic was decided. After a series of insults and injuries the French forcibly took possession of Venice; and at the treaty of Campoformio, made between France and Austria, in Oct., 1797, Venice and her possessions were formally handed over by France to Austria. Thus terminated the Venetian republic, after an existence of more than a thousand years.

VENICE (*Venézia*), a city in Austrian Italy, formerly the capital of the Republic of Venice, is situated in 45° 26′ N. lat., 12° 21′ E. long., on a number of islands in the lagunes, at the north-western extremity of the Adriatic, at a distance of 70 miles E. from Verona, the same distance W. by S. from Trieste, and has about 100,000 inhabitants. The lagunes are partially separated from the sea by a long spit of land called the littorale, which however is broken into several islands by openings, whereby ships pass up the canals to Venice. The islands on which the city stands are about 80 in number, divided from each other by narrow canals, which form the highways of communication, as streets in other towns, and are spanned by 450 bridges. Narrow streets and lanes, alleys and courts, separate the buildings of each island from one another, and there are also narrow quays in some places along the canals. Carriages and horses are useless, and therefore not seen in Venice, and their place is supplied by boats called 'gondole,' which are continually plying in all parts of the town. The city is two miles distant at the nearest point from the mainland, and has a circumference of about 8 miles. There is a tide from the Adriatic, which rises a few feet over the lagunes, part of which are left nearly dry at ebb, excepting the 7 large canals, which intersect the lagunes, and keep up the communication between the city and the ports of Malamocco and Chioggia on the Adriatic, and the landing-places of Mestre, Fusina, and others on the mainland.

The city is divided into two parts by the Canal Grande, over which there is only one bridge, the Rialto. Another and much broader canal, or rather arm of the sea, bearing the names of Canal della Giudecca and Canal di San-Marco, divides the city from the long island and suburb of La Giudecca, and from the neighbouring island of San-Giorgio. Venice contains about 2000 streets, lanes, and alleys, and 28,000 houses.

The finest part of the town is the district of San-Marco, which contains the splendid duomo or cathedral of San-Marco (built between 977 and 1043, and the finest Byzantine church in western Europe) with its lofty detached belfry; the handsome square before it, with its arcades and numerous coffee-houses—the fashionable place of resort of the Venetians; and the vast and massive ducal palace, which was the seat of the former republican government, and contains the halls of the various councils of the administration. The hall of the Senate, or Pregadi, is still in the same state in which it was before the fall of Venice; that of the Council of Ten has been made into a painting gallery. The vast hall in which the Great Council used to assemble, is now the repository of the library of San-Marco. All these apartments are adorned with numerous paintings by the great masters of the Venetian school, commemorating the great events and the leading characters in the history of the republic. The library contains 65,000 volumes, and about 5000 MSS. The Sotto Piombi, or attics of the palace of the doges, formed the state prison of Venice, and on the ground floor were the pozzi, or dungeons, the horrors of which exist mainly in the imagination of poets and romance writers. The piazzetta, or lesser square of San-Marco, which is open on one side to the sea, has two handsome pillars of granite brought from Greece in the 12th century. Upon one is the winged lion, of brass, the emblem of the republic, known by the name of the Lion of St. Mark, and upon the other is a statue of St. Theodore.

Among the many remarkable churches of Venice, besides the Cathedral of San-Marco, are the following which deserve especial mention. San-Giorgio Maggiore, constructed by Palladio, has the sepulchral monument of the Doge Domenico Michielì, the conqueror of Jaffa, Tyre, and Ascalon, and the 'Terror of the Greeks.' Il Redentore, also by Palladio, one of the handsomest churches in Venice, situated on the island of La Giudecca, is, like most other Venetian churches, rich in paintings. SS. Giovanni e Paolo, has numerous and splendid monuments of doges, senators, commanders, and other illustrious men. I Frari, a splendid church with numerous monuments, among others that of Canova, and several good paintings. In the suppressed convent of the Frari are deposited the archives of the old republic. In the cathedral of San-Marco, the description of which would fill a volume, and in all the churches of Venice, there are great numbers of fine paintings, monuments, and sculptured ornaments.

The banks of the Canal Grande are lined with splendid marble mansions of the nobility, some of which are used as government offices, others are let to foreigners, and many are falling to decay. The palaces Giustiniani, Pisani, Grimani, Michieli, Contarini, Vendramini, Manfrini, still possess valuable paintings and sculptures, especially the last named, which has a rich gallery, containing among others the painting of the three portraits by Giorgione, which Byron in his 'Beppo' has so highly extolled. The Academy of the Fine Arts has been the means of saving many master-pieces of the Venetian school, which otherwise would have been lost to Venice. The gallery of the academy contains altogether about 400 paintings, besides models of the Elgin and Ægina marbles, a model of the statue of Theseus conquering the Centaur, by Canova, and a collection of original drawings of Leonardo da Vinci, Michel Angelo, and Raphael.

The Arsenal or dockyard of Venice, begun in 1304 and celebrated in Dante's 'Inferno,' canto 21, is situated at the eastern extremity of the city; it is surrounded by a high wall, and occupies an area of about three miles in circumference. When the Abbé Richard saw it (1761–2), there were about forty ships of war, of which twelve were three-deckers, in the docks ready for sea; arms for 150,000 men, 2500 pieces of brass ordnance, besides 1500 iron cannon, and vast stores of provisions; cables, sails, timber for ship-building, brought from the forests of Istria and Dalmatia, and all other appurtenances of such an establishment. The arsenal is now the dockyard for the insignificant Austrian navy. A naval college with 30 boarders is established at Venice. There is in the arsenal a monument in relief, by Canova, to the memory of Angelo Emo, great admiral of Venice, who died in 1792, and was the last that caused the Venetian flag to be respected in the Mediterranean. At the land entrance of the arsenal, which is a gate adorned with several statues, are two marble lions, brought from Athens by Morosini in the latter part of the 17th century.

Venice has several theatres; that of La Fenice is one of the largest in Italy. It has also a gymnasium, a lyceum for scientific instruction, a patriarchal seminary for clerical students, two colleges for female education under the direction of nuns, an Athenæum of Sciences and Literature, and the Academy of the Fine Arts already mentioned. Besides the library of San-Marco, there are libraries belonging to the different colleges and academies, as well as to several convents and palaces of the nobility. The printing-press of Venice, though not so flourishing as it was in the time of the Aldi, is still active. The charitable institutions are numerous, but not more so than what is absolutely required by the decayed condition of Venice. When the French evacuated the town in 1814, nearly one-half of the population was in want of charitable assistance. The misery was frightful. The exertions of the Austrian government from 1814 to the insurrection of 1848, had greatly alleviated the distress of the Venetians. Pecuniary assistance from the treasury of the kingdom, a better administration of the communal revenue, a great diminution of local taxation, the establishment of a free port, and important public works undertaken at the expense of the government, had restored to the city a considerable measure of prosperity. A railroad was completed between Venice and Verona. The mercantile shipping of the port had assumed a new activity, and traded all over the Mediterranean. The number of vessels which entered the port of Venice yearly was between 1200 and 1300, including small craft. But in 1848 the citizens revolted against Austria, offering to become the subjects of Carlo Alberto, king of Sardinia; after whose defeat they formed a republic, and maintained a long siege against the Austrians, to whom the city surrendered Aug. 22, 1849. During the siege, which was not very actively carried on, the structures of the city were not injured, whatever violence there was being exerted against the forts on the mainland and at the entrances of the canals through the littorale. But since Jan. 1, 1850, Venice has been deprived of her privileges as a free port; the transit duties between Venice and Austrian Italy have been abolished; and the entrepôt of foreign commerce is confined to the small island of San-Giorgio, on which are the custom-house and warehouses. Jewellery, glass, salt, hemp, timber, wool, raw and manufactured silk, foreign produce of various kinds, are its chief items of commerce; a great number of hands are engaged in the fisheries of the Adriatic. Steamboats ply to Trieste. Foreign consuls reside at Venice.

Among the island towns in the neighbourhood of Venice, the following deserve notice:—*Murano*, about a mile to the north of Venice, is a town of about 6000 inhabitants, and has manufactories of window and plate glass, mock pearls, and beads. The churches of San-Michele and San-Donato are very interesting and highly-decorated structures. *Malamocco*, the residence of the doges in the early ages of the republic, gives its name to the port of Malamocco, one of the principal entrances from the sea into the lagunes. *San-Lazaro*, an island S. of Venice, has a celebrated monastery of Armenian monks, who are in communion with the Church of Rome; they have a library of 10,000 volumes and about 400 MSS., mostly in the Armenian language, a printing-press for works in the same language, and a college for clerical students. *San-Andrea-del-Lido* contains a fortress, which is considered a masterwork of the architect and engineer San-Micheli, and which commands the entrance into the lagunes on that side. *Palestrina* is a small town S. of Malamocco, on the Littorale. Near it are the 'Murazzi,' or breakwater, made of large blocks of marble laid on piles driven into the sand: it rises 10 feet above high-water. *Chioggia*, a well-built town and a bishop's see, situated at the southern entrance of the lagunes, has a good harbour, a fine cathedral, a theatre, and about 16,000 inhabitants. The salt-pans in the neighbourhood are very productive.

The province of Venice contains 1056 square miles, with 265,551 inhabitants. It comprises, besides the islands in the lagunes, a long strip on the mainland from the æstuary of the Po to that of the Tagliamento, with several small towns. The fine country-seats along the banks of the Brenta on the road to Padua are in this province. Of the whole of the dioceses in the old Venetian states the Archbishop of Venice, who is styled patriarch, is metropolitan.

VENIE'RO, DOME'NICO, born at Venice in 1517, of a patrician family, applied himself to literature, and especially to poetry. Confined to his apartments for many years by ill health, he found comfort in the society of learned men who resorted thither to converse, debate, and compose extempore poetry. These meetings were the origin of the 'Academia Veneziana,' instituted in 1558.

Veniero wrote a number of poems, remarkable for their lively conceptions and power of expression:—'Rime di Domenico Veniero Senatore Veneziano raccolte ed illustrate dall' Abate Pier

Antonio Serassi,' Bergamo, 1751, with a biography of the author. He also executed some translations. He died in 1582.

VENI'RE FA'CIAS, or *Venire*, the name of a writ addressed to the sheriff or other returning officer, commanding him 'to cause to come' (venire facias) the parties set forth at the place named in the writ. The purpose to which the writ has been generally applied, and in reference to which it is generally known, is in summoning juries to serve for the ordinary trial of civil causes.

This writ is sued out, but is not acted upon, for the court assumes that the jurors have been summoned upon it and have failed to appear at Westminster, where anciently the trial itself took place. At the same time another writ issues, by which the sheriff is commanded to distrain their lands or goods, or have their bodies, so as to compel their appearance either before the court at a subsequent day, or before the judges of assize or Nisi Prius, if they should previously come into the county. This is so arranged that the judges always do previously come into the county, and the jury are summoned and caused to appear before them. [JURY; VENUE.]

VENLOO. [LIMBURG, *Dutch.*]

VENOSA. [BASILICATA.]

VENTILA'GO, a genus consisting of only a single species of plants, of the natural order of *Rhamnaceæ*. It forms a large climbing shrub with stiff branches. It is often diœcious, and has flowers which have an offensive smell.

VENTILATION. [WARMING AND VENTILATION.]

VENTIMIGLIA. [NICE.]

VENTRE INSPICIENDO, WRIT DE. 'When a widow is suspected to feign herself with child in order to produce a supposititious heir to the estate, the heir presumptive may have a writ de ventre inspiciendo, to examine whether she be with child or not; and, if she be, to keep her under proper restraint till delivered; which is entirely conformable to the practice of the civil law: but if the widow be, upon due examination, found not to be pregnant, the presumptive heir shall be admitted to the inheritance, though he hath to lose it again, on the birth of a child within forty weeks from the death of a husband.' (Blackstone, 'Comm.,' i. 456.) The Roman practice is explained in the Title of the Digest (25 tit. 4), 'De inspiciendo ventre custodiendoque partu.'

The form of the English writ De Ventre Inspiciendo is given Co. Litt., 8 b. It is directed to the sheriff, and commands him to empanel a jury of twelve women to search whether the widow be enceinte. If they find that she is with child, another writ issues which commands that she shall be safely kept and duly inspected by the women, who must be present at the delivery.

VENTRICLE. [HEART.]

VENTRILOQUISM (literally 'belly-speaking,' from *venter*, the belly, and *loquor*, I speak) is a vocal mimicry of sounds, by which an illusion is produced on the hearer, who supposes that the sound comes, not from the mimic, but from some other place.

The form and size of the vocal tube can be altered in various ways—as by dilating or contracting the pharynx; by dilating or contracting the mouth; by contracting the communication between the pharynx and mouth; and by altering the form of the mouth's cavity. Each of these modifications of the vocal tube confers a peculiarity of quality to the voice. All these are vocal or laryngeal sounds. Sounds can be produced in the vocal tube apart from the larynx. These are not vocal sounds. Some of them however may be of a definite and uniform pitch, while others are mere noises, as gurgling, whistling, snoring, and many others.

Passing from the imitation of sounds, as that of knife-grinding, sawing and planing wood, the voices of animals, &c., we proceed to explain those illusions where the voice so perfectly counterfeits the reality intended, that it appears not to issue from the mimic, but from another source.

The essence of ventriloquy consists in creating illusions as to the distance and direction whence a sound has travelled; which are thus explained:—

1. *Distance.* We do not hear the distance which a sound has travelled from its source, but we judge the distance from our former experience, by comparing the loudness which we hear with the known distance and known loudness of similar sounds heard on former occasions. Near sounds are louder than distant ones. Now by preserving the same pitch, quality, and duration, but with an accurately graduated reduction of loudness, a series forming a perspective (if the term be allowable) of sounds may be created, which, falling in succession on the ear, will suggest to the mind a constantly increasing distance of the sound's source. In this way Mr. Love produces an imitation of a receding watchman crying the hour so perfect as to appear a reality. An effort of a similar character, but in which the source of sound is approaching, is produced at the theatre in the representation of Macbeth. A military band is faintly heard, which gradually increases in loudness, suggesting to the mind the approach from a great distance of the victorious army of Macbeth, until the ordinary degree of loudness suggests its proximity, when the army immediately comes upon the stage. The estimate then which is formed of the distance which a sound has travelled before reaching the ear is a judgment of the mind formed by comparing a present perception (by hearing) with the remembrance of a former loudness in connection with its known distance.

2. *Direction.* The direction whence a sound comes seems to be judged of by the right or left ear receiving the stronger impression, which however can only take place when the sound's source is in a plane, or nearly so, with a line passing through both ears. It is familiarly known that a person in a house cannot by the noise of an approaching carriage judge with certainty whether it is coming from the right or left. He accurately judges it to be approaching, passing, or receding, as the case may be, by the gradations of loudness, but is unable to decide with certainty whether its approach or recession is from up or down the street. Common experience shows the judgment

to be more fallible concerning the direction than the distance of sounds.

It has been remarked that ventriloquists indicate either directly or indirectly the direction in which they wish the audience to believe the sound is coming. Thus they directly indicate it by words, such as—'Are you up there?' 'He is up the chimney.' 'He is in the cellar.' 'Are you down there?' &c. And they indirectly indicate it by some suggestive circumstance, as an action or gesture which is so skilfully unobtrusive and natural as to effect its object without being discovered. Thus, when the ventriloquist looks or listens in any direction, or even simply turns towards any point, as if he expected sound to come thence, the attention of an audience is by that means instantly directed also to the same place. Thus, before a sound is produced, the audience expect it to come in the suggested direction. And the ventriloquist has merely by his adjustment of vocal loudness to indicate the necessary distance, when a misjudgment of the audience will complete the illusion which he has begun.

The ventriloquist imitates the sound, not as it is heard at its source, but as it is heard after travelling from a distance. A skilful ventriloquist can effect his imitations without much movement of his lips and features. It has been observed, that ventriloquists during their efforts turn the front face away from the audience and scarcely even show the profile. This observation as far as regards moderate-sized rooms is generally true, but the front face is occasionally shown in a theatre.

It is quite easy to speak without moving the jaw, and it is the jaw's movements which disturb the features in utterance. Now the labial sounds, as B, P, M, when the jaw is thus fixed, can be made with a slight movement of the lips. The lips and jaws being always somewhat open during ventriloquy, a slight labial movement remains unnoticed, unless special attention be directed to it; and all the modifications of voice can be produced without at all distorting the features or moving the lips.

VENUE (*vicinetum, visne,* 'neighbourhood'). The county in which the trial of a cause takes place is said to be the Venue of that cause. The old practice in this matter is connected with the original functions of the jury, as persons who were acquainted with the facts in issue. [JURY.] In order then that a proper Venire might issue to the sheriff, the place in which the action was brought was stated in the margin of the declaration, and on the statement throughout the pleadings of any issuable fact a statement was also made of the place at which such fact was alleged to have occurred. As to all such facts upon which issue was taken, a Venire was sued out applying to each different place. The sheriff returned jurors from that place, and by those jurors the facts were decided, so that several distinct Venires and trials might be necessary to dispose of the issues in one action.

When juries began to determine on the evidence of witnesses, this practice declined, till at last, the form of the Venire still continuing the same, two jurors from the same hundred only were required for the trial of a personal action. By the stat. 16 & 17 Car. II., c. 8, it was enacted that no error should be brought, because there was no right Venue, provided the cause was tried by a jury of the proper county or place where the action was brought. After this statute the practice was established of trying all the issues by the jury of the general Venue in the action. By 4 Anne, c. 16, it was further enacted that 'every Venire Facias for the trial of any issue shall be awarded of the body of the proper county where such issue is triable:' that is, from the county at large, and such is still the practice. By a general rule of all the courts, of Hilary Term, 4 Wm. IV., it is ordered, that 'in future the name of a county shall in all cases be stated in the margin of a declaration, and shall be taken to be the Venue intended by the plaintiff, and no Venue shall be stated in the body of the declaration, or in any subsequent pleading.'

A distinction was long since established between local (that is, actions relating to real estate) and transitory (that is, actions of debt, contract, for personal injuries, &c). In regard to the former, it was held that the place in which the subject-matter was situated must be laid as the Venue in the action, and that rule still prevails. In transitory actions, the subject-matter of them being held not to have any fixed place, the plaintiff had liberty to bring his action in any county. Consequently, though the cause of action has occurred even out of the kingdom, the plaintiff can bring his action in the courts of this country. The plaintiff has still this liberty in a transitory action. But the courts upon application made to them can change the Venue. This is done upon its being made to appear that great inconvenience would arise from trying in the original county, because the body of the evidence lies in another, or because from local prejudices a fair trial cannot be had, &c. And the same authority is exercised even in local actions. (Stephens 'On Pleading,' c. ii., s. 4, v. 1.)

In criminal trials the Venue is the county in which the offence charged was actually committed; before a grand jury of that county the indictment must be preferred, and before a petty jury the trial had. The courts however have the same discretion as to the power of changing the Venue as in civil cases; and as to criminal trials many exceptions have been introduced by various statutes.

VENUS. [APHRODITE.]

VENUS, the name of the planet which is nearest to the earth, and, except Mercury, nearest to the Sun.

The general description of its appearance in our day, as given by Sir J. Herschel, is as follows: 'Although it occasionally attains the diameter of 61″, which is larger than that of any other planet, it is yet the most difficult of them all to define with telescopes. The intense lustre of its illuminated part dazzles the sight, and exaggerates every imperfection of the telescope: yet we see clearly that its surface is not mottled over with permanent spots like the moon; we perceive in it neither

mountains nor shadows, but a uniform brightness, in which sometimes we may indeed fancy obscurer portions, but can seldom or never rest fully satisfied of the fact. The most natural conclusion, from the very rare appearance and want of permanence of the spots, is, that we do not see, as in the moon, the real surface of this planet, but only its atmosphere, much loaded with clouds, and which may serve to mitigate the otherwise intense glare of its sunshine.'

Venus, like Mercury, from the orbit being entirely within that of the earth, is never at more than a certain angular distance from the sun: her greatest angular distance, or elongation, being from 45° to 47° 12′. Her mean apparent diameter is 16″.9, but varies from 9″.6 to 61″.2. The real diameter is .975 of that of the earth, or about 7700 miles, and tne volume is .927 of that of the earth.

This planet revolves on its axis in about 23^h 21^m 7^s, though this, owing to the absence of definite spots on its disc, can hardly be considered as very accurate. Its light and heat are to that of the earth as 1911 to 1000.

The distance of Venus from the sun is about three quarters of that of the earth, and the planet revolves in $294\frac{7}{10}$ ordinary days.

When Venus is to the west of the sun she rises and sets before him, and was then called Phosphorus and Lucifer by the ancients; but when she is to the east of the sun she rises and sets after him, and was then called Hesperus. The old terms of our almanacs, 'Morning-Star' and 'Evening-Star,' have reference to these positions.

VERA CRUZ, a seaport and commercial town in the United Mexican States, is situated in 19° 11′ N. lat., and 96° 8′ W. long., on the south-western shores of the southern part of the Gulf of Mexico. It is still the most important commercial town of the republic, though it has properly speaking no harbour, but only a roadstead formed by several shoals, which enclose in a semicircular form a tract of sea which in many parts offers good anchorage. The fortress of San Juan de Ulloa is built on a rocky island, at the end of one of the shoals.

Vera Cruz is built on a level and arid shore, consisting of sand, and almost entirely destitute of vegetation. At the back of the town are sand-hills, which rise from 25 to 36 feet above their base, and are composed of sand so fine and loose that they annually change their form and position. The reflection of the solar rays from these hills is supposed to be one cause of the great heat of the town during summer. Vera Cruz is enclosed by walls. The streets are straight and wide: the paving is very good, and every street has a raised footway on each side, of a convenient breadth. Many of the houses are excellent, and all are constructed of a porous white coral, which composes the cliffs on the coast, and is usually found in large rounded masses. The houses are all flat-topped and covered with cement. There are several hospitals; but the public buildings generally are not distinguished by beauty. Rain-water is collected in tanks on the roofs of the houses; but the common people use the water brought by an aqueduct from the Laguna, a lake about 6 miles distant from the town.

Before 1820 Vera Cruz was the only port on the eastern coast of Mexico from which the produce of the country was exported, and by which foreign goods destined for the consumption of the interior reached their destination. At that period the value of the articles exported amounted to 21,780,000 dollars, and those imported to 14,650,000 dollars. But soon after 1820 the other ports of the country were thrown open to the foreign trade, and since that time many of its productions, especially the produce of the northern mines, have found their way to other ports, especially to Tampico. Still the commerce of Vera Cruz is considerable. The vessels which entered Vera Cruz in 1845 were 268, having cargoes valued at 470,000*l.*; those which departed were 271.

The island on which the fortress or castle is built was visited for the first time by Europeans under the command of Juan de Grixalva in 1518, and in the following year Cortes landed his army at the place where the town now stands; but the town founded by him, and called Villa Rica de Vera Cruz, was some miles farther north. After three years that place was abandoned, and another town was built a little farther south, at a place still called Antigua, to distinguish it from the present town. This situation also was found inconvenient, and the present town was built towards the close of the 16th century, but it was not incorporated before 1615. The American army took the fortress of San Juan de Ulloa, and consequently the town of Vera Cruz, in the late war in Mexico.

VERAGUA. [PANAMA.]

VERA'TRIA, a vegetable alkali prepared from Cevadilla, the seed of the *Helonias officinalis*. It is a white or greenish-white powder, which has a silky and crystalline appearance under the microscope; it is inodorous, very acrid, and poisonous. It is insoluble in water and alkaline solutions; very soluble in alcohol, and sparingly in æther. The solution when evaporated deposits transparent laminæ. The salts of Veratria are neutral, and have a slight styptic taste. Veratria consists of C^{34} H^{22} O^6 N^1.

VERATRIC ACID, the acid with which veratria exists combined in Cevadilla. It consists of C^{18} H^9 O^7. It crystallises in short prisms, which are transparent and colourless, and slightly sour to the taste. It melts at a high temperature into a colourless liquid, and sublimes without leaving any residue. Veratric acid forms crystallisable salts with the alkalies, which are very soluble in water and alcohol.

VERA'TRUM, a genus of plants belonging to the natural order *Melanthaceæ*.

V. album, Common White Hellebore, is a native of moist alpine meadows in the southern, central, and northern parts of Europe, but is not a native of Britain. In company with the *Gentiana lutea* it is one of the most prominent features in the rich pastures of the Alps of Switzerland and Savoy. *V. viride*, Green-Flowered Veratrum, is a North American species, and is found in swamps

and bogs from Canada to the Carolinas. *V. nigrum*, Dark-Flowered Veratrum, is a native of dry mountainous situations in Siberia, Hungary, Austria, and Greece. It will grow freely in gardens in Britain, especially in a light soil. *V. Virginicum*, Virginian Veratrum, grows amongst luxuriant herbage in low grounds from New York to the Carolinas. It is a hardy plant, and may be grown in gardens in Britain.

VERA'TRUM ALBUM (White Hellebore)—*Medical Properties of.* Of this, two varieties (if not distinct species) are officinal: one termed *V. album;* the other *V. Lobellianum*. This last prefers a chalky soil; the plants occur in the meadows of the Swiss Alps, the Pyrenees, the mountains of Austria, and in Siberia. The rhizoma of both kinds is collected indiscriminately. It is nearly devoid of odour, but has an acrid, bitter, burning taste. It is easily powdered, but the person engaged in powdering it should wear a mask, as it excites a heat, an eruption of the skin, and any drawn up the nostrils causes violent sneezing and inflammation of the lining membrane of the nose. In doses short of any dangerous or violent effect, white hellebore exercises a peculiar action on the secreting organs, the stomach and intestines, and the nervous system. Almost all mucous surfaces, and the glands connected with them, as well as the kidneys, are excited to increased secretion.

The medicinal employment of white hellebore is not very great in the present day; but when administered with due caution it is of great service in gouty and dyspeptic disorders, where there is torpor of the liver, sluggish bowels, and defective secretion from the kidneys. From its influence on these organs it often proves useful in chronic cutaneous diseases, in which the digestion is always impaired. It is likewise used as a sternutatory, largely diluted with some starchy powder.

VERB (from the Latin *verbum*, a 'word'). The various words which belong to a language have been distributed into classes, called the Parts of Speech, of which the verb is one of the principal.

The term Verb comprehends those words in a language which are used to indicate the relations of mode or mood, which means manner, and the relations of time or tense. The relations of mood and tense are the essential characteristics of the verb. The mood is direct affirmation or negation, as indicative; or a way of giving a command, as imperative; or dependent or subjoined, as subjunctive; or indeterminate in itself, as infinitive. Tense refers to time present, past, or future. The verb is also characterised by indicating the relations of subject to subject, or subject to object, whether these relations are expressed by some part of the word called verb, or by some other words which are to be viewed in relation to the verb, in order to denote these relations of subject to subject or subject to object. Thus the Latin forms 'amo,' 'I love;' 'lego,' 'I read,' comprehend the relations of mode, time, and subject; and the phrases 'amo puellam,' 'lego librum,' comprehend also the relation of the subject to an object. Verbs contain the notion of an activity; but this activity may be either directed from a subject to an object, or remain in the subject, as 'I love Elizabeth,' or 'I walk.' Dr. Becker observes, 'The notion of an activity is expressed by a verb, when the activity is contemplated as bearing the relations of person, time, and mood to the speaker: *e.g.* "he drank," "he fled," "the tree grows:" it is expressed by an adjective when it is not thus related to the speaker: *e.g.* "a drunken person," "a flighty thought," "a great tree." The notion of an existence, *i.e.* of a person or thing which really exists, or is conceived by the mind as existing, is expressed by a substantive: *e.g.* "a drinker," "a drink," "the flock," "the flight," "the growth."'

Dr. Becker considers, in general, all roots to be verbs, and all radical notions as notions of activity. He concludes consistently, that all substantives as well as adjectives are derived from verbs, that is, from a root which is a notion of activity; and 'all notions expressed by substantives are notions of activity transformed into notions of existence.' This theory of language involves many difficult questions as to the origin of our ideas, and for practical purposes it is of little value.

Words when reduced to their simplest forms, that is, to their roots, are neither verbs, nor nouns, nor adjectives: they are roots. The discussion whether the noun or the verb should be considered the root, in cases where both contain a common element, is a discussion about nothing at all. The element may exist in a somewhat varied form in the noun and in the verb, and the variations in each case can be referred to a particular class of verb and noun. The characteristics of the verb have been already stated.

The characteristics of the noun are the same as those of the adjective. When the characteristic marks of verb, adjective, and noun are taken away, there remains root, which in itself has no grammatical name as opposed to any other kind of word. Roots may be classified like grammatical words, but they are still roots and nothing more. The only difficulty that may be suggested as to this explanation is that the root and the noun may be identical in form, as in many instances in our own language, such as 'man,' 'dog,' &c. But though these words in themselves suggest a notion of something intelligible, they are not nouns, unless they are used as parts of speech. It is only when we view words as the constituent parts of language that we give them grammatical names.

According to Becker's principles, the verb 'to be' is not a verb: it implies 'not a notion, but a mere relation.' But 'to be' implies the notion of existence, and is the only word that does; for if we contemplate anything as existing, such as God, the notion of 'is' is inseparable from the notion God: and so of other things that are conceived as existing. All verbs also are resolvable into 'is,' and something else; and it is by virtue of this 'is' that this something else is conceived to be. The division of verbs into Active, Passive, and Neuter, is founded on the notion of a verb expressing doing, suffering, and a condition. But this division is objectionable, because it introduces

considerations foreign to the subject of grammar: it involves a metaphysical question. The division of verbs into Transitive and Intransitive is a grammatical division, and is useful. A verb is transitive when it has an object which is not the subject, as 'I blame John.' A verb is intransitive when the subject of the verb is the object of the notion of the verb. Intransitive Verbs therefore, considered as grammatical forms, comprise what are called Neuter Verbs and Passive Verbs. Viewed with reference to predication, that form of the intransitive verb which is called the neuter, as 'I walk,' differs from what is called the passive, as 'I am loved,' merely in this: the neuter implies nothing external to the 'I,' which is the object of its own energy; the passive implies something external to the subject, of which external thing the subject is an object. Consequently it is only another mode of expressing the notion of the transitive verb. The peculiar form which this so-called passive voice has, depends on the character of each language. The so-called Reflective Verb is in form either a transitive verb when the subject is also expressed as its own object, or a passive verb, in which the implied external thing is identical with the subject.

The peculiar characters of verbs in any given language form an important part of the study of such language. It has been said that mood and tense are the characteristics of a verb; but it is not necessary that the words which denote mood and tense should be attached to the root for the purpose of making a verb. The English language contains cases where the words which express mood and tense are quite distinct from the root, which their relations to it convert into the quality of verb. Whether such modifying words shall be attached to the root or not, is an accident of language, not an essential. There may be other adjuncts to the root besides mood and tense, and these adjuncts may, according to the character of a language, be either attached to the root, or detached from it, though related to it. Professor Key's Latin Grammar explains the form of Latin verbs.

VERBASCI'NÆ, a natural order of plants comprising the genera *Verbascum*, *Ramondia*, *Celsia*, and *Isanthera*. Three of these genera are comprised in the section *Verbasceæ*, of the order *Scrophulariaceæ*, as defined by Bentham, who is followed by Lindley and others.

The genus *Verbascum* derives its name from *barbascum*, which was applied to some of the species on account of the bearded filaments. There are about 70 species. *V. Thapsus*, Mullein, is a native of waste sterile places, especially of chalky and gravelly soils, throughout Europe. It is also found in Siberia, the Taurus and Caucasus, and in Nepaul and Kumaon. The leaves are remarkable for their woolly character. This plant was formerly much used in medicine, in cases of chronic catarrh and other affections of the chest, in the form of infusion or decoction.

V. Blattaria, Moth Mullein, is a native of the middle and south of Europe, some parts of Asia, and North America. It is not a common plant in Great Britain, although in some places it is abundant. It is called *Blattaria*, because it is said to drive away the Blatta or Cockroach.

The genus *Celsia* was named in honour of Dr. Olaus Celsius, Professor of Greek in the university of Upsal. Most of the species of Celsia, of which there are about a dozen, bear showy yellow flowers, and are often cultivated in gardens. They require more care than the mulleins.

The genus *Ramondia* was named after M. L. Ramond, a French botanist and traveller. Its flowers resemble those of Celsia. It has but one species, the *R. Pyrenaica*. It grows on the Pyrenees, and is a pretty little alpine plant, without any stem, and with large purple flowers.

VERBASCUM. [VERBASCINÆ.]

VERBE'NA, a genus of plants, the type of the natural order *Verbenaceæ*. Most of the species of this genus are weeds, and are generally inhabitants of Europe and North America.

V. officinalis, Common Vervain, is a native of waste ground and roadsides in most parts of Europe, and is common in England. It is not found in Ireland. The virtues formerly attributed to this plant appear to have been imaginary. *V. Aubletia*, Rose-Coloured Vervain, is a shrubby biennial, with the stem about a foot high, and flowers of a fine pink or crimson, larger than most of the genus. It is a native of North America. *V. triphylla*, Lemon-Scented Vervain, is a native of Chili. In Italy, Spain, and the south of France this plant is naturalised, and in Jersey and Guernsey it bears exposure all the winter.

VERBENA'CEÆ, a natural order of plants belonging to Lindley's nucamentose group of monopetalous Exogens. The species are trees or shrubs, sometimes only herbaceous plants.

The plants of this order are rare in Europe, in the north of Asia, and in the north of America; they are common in the tropics of both hemispheres, and in the temperate districts of South America. In temperate regions the species belonging to the order are herbs, but in tropical climates they are shrubs and gigantic trees.

VERCELLI. [NOVARA.]

VERDIGRIS. [COPPER.]

VERDS, CAPE. [CAPE VERDS.]

VERDEN, a town in the province of Stade, in Hanover, is situated in 52° 56′ N. lat., 9° 15′ E. long., on the Aller, over which there is a bridge 400 paces in length. It is surrounded with walls, and has three gates. The principal building is the gothic cathedral. The inhabitants, about 5000 in number, have tobacco and snuff manufactories, breweries, and brandy distilleries, but are chiefly engaged in agriculture and in the transit-trade between Hamburg and Westphalia.

VERDIC ACID, a vegetable acid, in the state of a brittle yellow mass, which reddens litmus and does not alter in the air. When it is saturated with an alkali, ammonia for example, and exposed to the air, it absorbs oxygen and becomes gradually green. The acids then precipitate it in the form of a reddish-brown powder, which is Verdic Acid: this redissolves and becomes green with the alkalies. The earthy or metallic *Verdites* are yellow, while the *Verdates* of the same bases are green.

VERDICT. [JURY, vii., 669.]

VERDITER. [Copper.]

VERDUN. [Meuse; Saône-et-Loire.]

VERDUN-SUR-GARONNE. [Tarn-et-Garonne.]

VERE, SIR FRANCIS, was born in 1554. He was the 2nd son of Geoffrey de Vere, who was the 3rd son of John de Vere, 15th earl of Oxford. Sir Francis Vere began his career of active service as one of the captains of the force sent, under the Earl of Leicester, to the assistance of the Dutch in 1585, and had a leading part in the war between the Dutch and the Spaniards throughout the next fifteen years. In 1592 he obtained a seat in the House of Commons as one of the members for Leominster; but he is supposed to have remained nevertheless in the service of the States of Holland. He greatly distinguished himself, both in the action with the Spanish fleet, June 20, 1596, and in the successful attack upon the town of Cadiz two days after. In the summer of 1597, he accompanied the Earl of Essex on his second expedition against Spain; and after his return home he received from the queen the government of Briel (the Brill). He also held under the States the command of the English troops in the service of Holland. In this service he continued nearly all his life, and distinguished himself in the battle of Nieuport and by the defence of Ostend. He died in England Aug. 28, 1608. His military achievements have been recorded by his own pen in 'The Commentaries of Sir Francis Vere,' which were published, in folio, at Cambridge, in 1657.

VERE, HORACE, or HORATIO, LORD VERE, the youngest of the three brothers of Sir Francis Vere, was born at Kirby Hall in Essex, in 1565. He accompanied his brother to Holland in 1585, and shared in most of his enterprises there, as well as in the first expedition to Cadiz, for his valour on which last occasion he was knighted. In 1603 he joined the army under Prince Maurice. On the death of his brother, he succeeded him both as governor of the Brill and as general of the English forces in the service of Holland. The town of Brill being delivered up to the Dutch in 1616, Sir Horace Vere was allowed a pension by James I. In 1618 he assisted the Prince of Orange in putting down the Arminians, or Remonstrants, at Utrecht. In 1620, he was appointed to command the forces raised in England for the assistance of the elector palatine, Frederic V., in his attempt to secure the crown of Bohemia; and he behaved with his usual spirit in the disastrous contest which ensued. After his return home, he was, July 20, 1624, nominated by King James one of the council of war appointed to manage the business of the palatinate; and immediately after the accession of Charles I. he was raised to the peerage. In March, 1629, Lord Vere was made master of the ordnance for life, still retaining his post of commander-in-chief of the English forces in the Netherlands. He died in London, May 2, 1635.

VERGARA. [Basque Provinces.]

VERGENNES, CHARLES GRAVIER, COMTE DE, the son of a president *à mortier* of the parliament of Dijon, was born in that town, Dec. 28, 1717. He commenced his diplomatic career as attaché to M. de Charigny while on his missions to Lisbon and Frankfort; and in 1750 he was appointed minister to the electoral court of Trier. Here through his influence with the elector he was enabled to play a very important part in opposition to the designs of Maria Theresa. Vergennes was next sent to Constantinople, where he arrived in May, 1755, receiving some months afterwards the title and authority of ambassador, in order to excite a war between Russia and the Porte, which took place, though without any material influence on his part, but in consequence of an incursion of the Cossacks into the Crimea. After his return home he lived in retirement until the fall of the Duke de Choiseul, when La Vrillière sent him to Sweden. It was during his residence that Gustavus III. accomplished the revolution which converted Sweden into an absolute monarchy. The credit of directing the king was attributed at Versailles to Vergennes, who was as a reward enrolled among the noblesse de l'épée. On the accession of Louis XVI. (July, 1774) Vergennes was made minister for foreign affairs, and so remained till his death, Feb. 13, 1787.

VERMANDOIS, a district of Picardy in France, of which St.-Quentin was the chief town, and which now forms portions of the departments of Aisne and Somme.

VERMES (*Worms*). Linnæus adopted this term as the title of a class, including all animals which he could not arrange under the *Vertebrata* or *Insecta*. In the 12th edition of the 'Systema Naturæ,' the Vermes are divided into *Intestina*, *Mollusca*, *Testacea*, *Lithophyta*, and *Zoophyta*. The progress of zoology since the time of Linnæus has rendered the class *Vermes* obsolete, and led to other arrangements. [Animal.]

VERMICELLI, a dried paste, manufactured chiefly in Italy in the form of smooth round strings. The name has been given to it on account of its worm-like appearance, 'vermicelli' in Italian signifying 'little worms.'

Maccaroni, is manufactured of the same kind of paste as vermicelli, and in a similar manner; but it is rather larger in diameter, and is hollow like the tube of a tobacco-pipe.

Fedelini is a kind still smaller than vermicelli.

The paste is made of wheat stripped of the husk, and ground roughly into a sort of grit. The kind of wheat preferred by the Italians is a small hard-grained species which they now cultivate on purpose, but which they formerly imported from the coasts of the Black Sea—'Grano di Mar Nero.' The ground wheat is mixed with clear soft water, and made into a paste by kneading it on a large block. The toughness and elasticity of the paste result from a long and powerful process of kneading. The paste is next forced by strong pressure through round holes in the bottom of a cylinder; but, to form maccaroni, a wire extends from a bridge in the upper part of the cylinder through the centre of each of the largest holes, and the paste, being forced through each hole around the wire, is consequently hollow. The strings, several feet in length, whether of maccaroni, vermicelli, or fedelini, having been thoroughly dried, are ready for use.

The Italians manufacture the paste into many other forms; into thin flat strips like ribbons, into thin sheets like paper, into round balls, and into beans and peas. The Neapolitans, who use great quantities of maccaroni as their favourite food, use nothing but the pure paste of wheat and water, but the Genoese mix saffron with it, which gives it a yellow tinge. The French, who also manufacture a good deal of it, frequently season the paste with various condiments.

VERMIGLI, PIETRO MA'RTIRE, born at Florence in 1500, studied for the church, and entered the order of the Regular Canons of St. Augustin. About 1540 he became a convert to the doctrines of the Reformation, and, proceeding to Strasburg, was appointed Professor of Divinity. In 1547 he repaired to England, where he was appointed Lecturer upon the Holy Scriptures at Oxford. In 1553, after the accession of Queen Mary, he returned to Strasburg, where he resumed his chair as Professor of Divinity, and likewise of Aristotelian philosophy. In 1556 he accepted the chair of theology in the University of Zürich. He died in 1562 at Zürich. He wrote on dogmatic and ethical subjects, commentaries on parts of the Scripture, &c. His works were translated from the Latin into English and published in 1583, with a biography of Vermigli by Josias Simler, of Zürich. He is commonly spoken of in England as *Peter Martyr*.

VERMILLION. [MERCURY.]

VERMONT, one of the United States of North America, is situated between 42° 44′ and 45° N. lat., and between 71° 30′ and 73° 28′ W. long. It is about 80 miles distant from the Atlantic, from which it is separated by New Hampshire and Maine. It is bounded N. by the parallel of 45° N. lat., by which it is separated from Lower Canada, E. by New Hampshire, S. by Massachusetts, and W. by New York. The greatest length S. to N. is 157 miles; the breadth varies, increasing as we proceed N., from 30 to 90 miles. The area is 10,212 square miles. The population in 1840 was 291,948, of whom none were slaves.

Surface and Soil.—Vermont constitutes a part of the irregular mountain-region which extends over the greater part of that portion of the United States which lies east of the river Hudson, and of Lake Champlain. The surface is very uneven, and much of it is mountainous. The Green Mountains traverse the state from S. to N. They rise near Bennington, at about 42° 50′ N. lat., and running from S. to N. form one continuous ridge as far as about 44° N. lat. The width of this ridge varies from 8 to 10 miles. The length is about 75 miles. The slopes are rather gentle, but more so on the east than on the west, where in many places they are steep. In general they do not rise to more than 2000 or 2500 feet above the sea, on a base which on the west may be 300 feet, and on the east 500 feet above the sea. The highest summit is Killington Peak, which is 3675 feet above the sea. The summits of the mountains are rocky, and only covered with a spongy green moss, from which circumstance it is supposed the name of the range is derived. The sides are covered with forests of evergreen-trees, especially pine, spruce, and hemlock. The country surrounding this portion of the Green Mountains on the south is of indifferent quality. The soil is chiefly stony and gravelly, but as it is well drained, it is used as pasture-ground, especially for sheep. The greater part is still covered with timber-trees. In proceeding northward the country improves. The soil is less stony and contains a larger proportion of loam or clay. The cultivated tracts are more numerous and extensive, and the crops more abundant, especially along the banks of the Connecticut, where some very fertile tracts occur.

At about 44° N. lat. the southern ridge of the Green Mountains spreads out to the E. and W., and becomes about 20 miles wide. The Green Mountains are here intersected by a depression, through which the Onion River flows to Lake Champlain, and which is traversed by the Valley Road. This road extends from Burlington through Montpelier to Hartford (Vermont). On the south side of the Onion River is the Camel's Rump, 4188 feet high; on the north side of the river is the Mount Mansfield, 4279 feet high. Farther to the north the Green Mountains spread out between Richmond and Danville to a width of about 40 miles.

North of 44° 40′ the mountain-region narrows to about 20 miles, and its sides are enclosed by two uninterrupted ridges, of which the western, occupying about the middle of the state, runs nearly due N. into Canada, where it terminates, not far from the banks of the St. Francis River, about 45° 25′ N. lat. The eastern ridge runs N. by E. a few miles from the banks of the river Connecticut, and enters Canada near the sources of that river, and terminates near the sources of the river St. John of New Brunswick. Both ridges appear to attain an elevation of 2000 to 2500 feet above the sea-level. The tract enclosed by these two ridges is much inferior in fertility to the region farther south.

The most level part of Vermont is that which lies on the banks of Lake Champlain, and may be called a plain, though the surface is broken by numerous watercourses. This plain is about 100 miles long, and in its southern districts less than 10 miles wide, but towards the north it widens to 30 miles. The soil varies greatly, and a large portion of it is productive.

Rivers and Lakes.—More than two-thirds of the drainage of Vermont runs into Lake Champlain, which is navigable by large vessels. [CHAMPLAIN, LAKE.] The largest rivers falling into that lake are Otter Creek, Onion River, the Lamoile, and the Missisqui, of which however only the first and last are navigable. Otter Creek rises on the western declivity of the Green Mountains, near 43° 15′ N. lat., and runs N. by W., nearly parallel to Lake Champlain. Its course probably exceeds 70 miles, and vessels may ascend it to Vergennes, about 8 miles from its mouth, where the first falls occur. The Onion River and the Lamoile originate in the mountain-region of the centre; and as they descend from a high level and have only a short course, their

current is very rapid and frequently interrupted by falls, so that no part of them is navigable. The Missisqui rises in Canada, and falls into Missisqui Bay, an arm of Lake Champlain, which is about 15 miles long and 3 wide, and in its whole extent navigable for such vessels as are commonly used on the lake. The northern portion of Missisqui Bay is within Lower Canada. A few small rivers which drain the northern district of the mountain-region fall into Lake Memphramagog, of which about one-fifth part lies within Vermont. This lake is nearly 30 miles long, but in no part exceeds 2 miles in width.

The river Connecticut, which runs between Vermont and New Hampshire for about 170 miles, is not navigable in the upper part of its course, where it presents a continual succession of rapids and cataracts; but from Haverhill (44° N. lat.) downwards the river is navigable for boats, at least in certain seasons. All the rivers falling into the Connecticut from the Green Mountains are small, and none of them navigable.

Climate.—Vermont is distinguished by the severity of its winter, which is beyond what could be expected from either latitude or elevation, and must be attributed to the northern and north-west winds which prevail in that season, and which before reaching this state pass over the wide plain of Canada, where their force is not broken nor their intensity moderated by any range of hills. The winter continues almost without interruption from about the 10th of December to the beginning of April. The frost is very intense. In summer, from June to August inclusive, rain is scarce, and the heat in the middle of the day is oppressive. The most pleasant season here is from the beginning of September to the middle of October, the heat being then moderate, and the air dry, elastic, and invigorating.

Animals and Produce.—It does not appear that the puma, which is found in the Essex Mountains of New York, occurs in the Green Mountains. There are bears, black cats, wild-cats, deer, foxes, hares, martins, ermines, porcupines, raccoons, skunks, several kinds of squirrels, weasels, and wolves. In the rivers and lakes are beavers, musk-rats, and otters.

Iron-ore is abundant along the western base of the Green Mountains, and between them and Lake Champlain. It is worked at several places. Sulphate of iron is abundant, and sulphuric acid is manufactured to some extent. There are also ores of lead, copper, zinc, and manganese.

Vermont is chiefly an agricultural state. There were however, in 1840, 91 woollen manufactories, which produced goods worth 1,331,953 dollars, and 26 forges, which produced 6743 tons of cast-iron and 655 tons of bar-iron.

Towns.—Vermont is divided into 14 counties. The following are the principal towns, with the population of each in 1840:—*St. Albans*, 63 miles N.W. by N. from Montpelier, is situated on elevated ground, 3 miles E. from Lake Champlain. Population of the township, 2702. *Bennington*, [BENNINGTON.] *Burlington*, 40 miles W.N.W. from Montpelier, is situated on the shore of Lake Champlain. It is the largest and most commercial town in the state. It has good wharves, and steam-boats ply regularly to and from Whitehall and other places on the lake. The town is well built, and is beautifully situated. It contains the university of Vermont, with 84 students and 7 instructors, a court-house, gaol, and 6 churches. Population, 4271. *Danville*, 30 miles N.E. from Montpelier, contains a court-house, gaol, and 2 churches. Population of the township, 2633. *Middlebury*, 59 miles S.W. from Montpelier, is situated on both sides of Otter Creek, at the falls, which afford extensive water-power. The town is irregularly laid out, but well built, and contains Middleburg College, with 60 students and 7 instructors, a court-house, gaol, and 5 churches. There are valuable marble quarries in the neighbourhood. Population, 3162. *Montpelier* is the capital of the state. It is situated in 44° 16′ N. lat., 71° 33′ W. long., at the junction of the two branches of the Onion River. It is a place of great thoroughfare in consequence of the Valley Road of the Green Mountains passing through it. It contains a handsome state-house, court-house, gaol, 4 churches, and 1700 inhabitants. *Newbury*, 36 miles S.E. from Montpelier, is situated on the west side of the river Connecticut. Population of the township, 2578. *Rutland*, 62 miles S.W. from Montpelier, is situated on Otter Creek, and contains a court-house, gaol, and 2 churches. Population of the township, 2708. *Vergennes*, a city, 66 miles W. by S. from Montpelier, is situated on Otter Creek, 7 miles from the mouth, and at the head of the navigation. There are extensive iron-works in the city and neighbourhood. It contains 3 churches and 1017 inhabitants. *Windsor*, 65 miles S.S.W. from Montpelier, is situated on the west side of the Connecticut, between two streams, one of which supplies good water-power. Population of the township, 2744. *Woodstock*, 51 miles S. from Montpelier, is watered by the river Otta Queechee and its branches, and by the Beaver Brook, all of which supply water-power. The town contains a court-house, gaol, and 5 churches. Population of the township, which includes another village, 3313.

History and Constitution.—The tract of country between Lake Champlain and Montpelier, called Vermont by the French settlers from its green mountains, was ceded by them to the British in 1763. The French had commenced their settlement as early as 1731, and the provincial government of Massachusetts had built a fort on the west bank of the Connecticut in 1724; but as the natives were numerous and hostile, little progress was made in colonising Vermont till after the British had conquered Canada in 1760, after which time it began to be settled rapidly. Vermont was at first claimed by Massachusetts, and afterwards by New Hampshire and New York. The rival claims were decided by the king of England in council in 1764, in favour of New York. A serious quarrel was the result of this decision, which was interrupted by the war of the Revolution, in which 'the green-mountain boys,' as they were called, distinguished themselves by their hardiness and bravery. In January, 1777, they declared the

state independent, but New York still claimed jurisdiction, which the green-mountain boys resisted. The differences however were finally adjusted in 1790 by Vermont paying to New York 33,000 dollars in full of all demands. In 1793 Vermont was constituted a state. The legislature consists of 30 senators, who are elected for one year, and 230 representatives, who are elected for one year. The governor is elected for one year. Vermont sends 2 senators and 4 representatives to Congress.

VERNAL, VERNAL EQUINOX. The word vernal is the adjective derived from *ver*, the spring; and the vernal equinox is that point of the equator which the sun crosses when it passes into the hemisphere of the observer, and when the days begin to be longer than the nights. Consequently that point of the ecliptic which is called the first point of Aries is the vernal equinox to those in the northern hemisphere, while the first point of Libra is the same to those in the southern.

VERNATION, in Botany, signifies the manner in which the young leaves are arranged within the leaf-bud. It is equivalent to the expressions Foliation and Præfoliation. It corresponds also to the terms Æstivation and Præfloration, which indicate the manner in which the parts of the flower are arranged in the flower-bud.

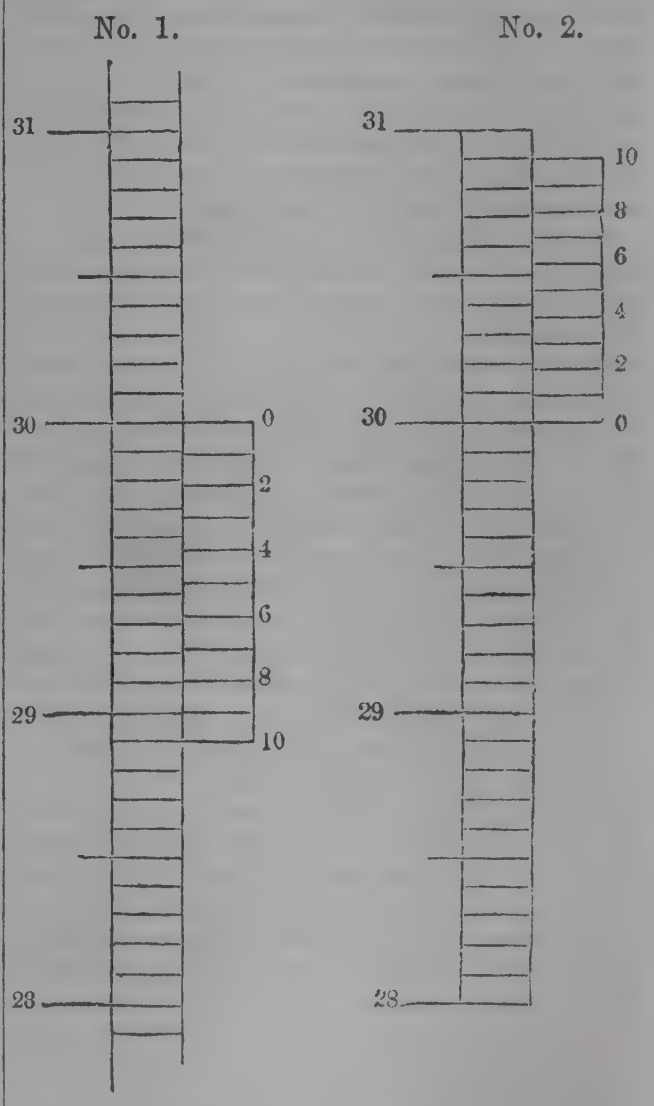
VERNET, CLAUDE JOSEPH, was born at Avignon, in 1714, and received his first instruction in painting from his father, Antoine Vernet, and Adrian Manglard, an historical painter. He studied with Fergioni at Rome, and remained in Italy twenty years, including some time spent in Greece and the Greek islands. During part of this period he was very poor. He made elaborate sketches of the most beautiful places which he visited, and painted several admirable pictures in Genoa, in Naples, and in Rome.

In 1743 he was made a member of the Academy of St. Luke; and about the same time he married Miss Parker, the daughter of an English officer in the Pope's marine. Vernet's reputation as a marine painter at length reached his own country, and in 1752 he was invited by Louis XV. to Paris. Here he was soon after elected a member of the French Academy of Arts. In 1753 he was commissioned by the government to paint pictures of the principal seaports of France. He painted fifteen views, which are now in the Louvre. He was in consequence of these works elected, in 1766, one of the council of the Academy, and Louis XV. gave him apartments in the Louvre. From 1752, when he returned to France, until the year of his death, 1789, Vernet painted upwards of 200 pictures, most of which have been engraved. He excelled in representing water in any state, but particularly when disturbed and boisterous. He was least successful in shipping: he was deficient in a competent knowledge of the rigging and construction of ships.

VERNET, ANTOINE CHARLES HORACE, commonly called Carle Vernet, a French historical, genre, and battle painter, was born at Bordeaux, Aug. 14, 1758, and was the pupil of his father, Claude Joseph Vernet. In 1787 he was elected a member of the French Royal Academy of Painting for a large picture of the Triumph of Paulus Æmilius, and he was subsequently, after the remodelling of the Academy, nominated a member of the Institute of France. In 1806 he was appointed painter to the Dépôt de la Guerre; and he was made subsequently Chevalier of the order of St. Michel, and a member of the Légion d'Honneur. His works are very numerous. He died Sept. 27, 1836. Horace Vernet, the most able French painter of the present century, is the son of Carle Vernet.

VERNEUIL. [EURE.]

VERNIER. We shall briefly explain the principle of the vernier (so called from Pierre Vernier, who invented it about 1631) in its simplest form.



Number 1 is the figure of a vernier for measuring hundredths of an inch, such as is usually applied to common barometers. The scale is on the left hand, on which the inches and tenths are marked. The portion on the right hand, which can be slipped up or down, remaining always in contact with the scale, is the vernier. It is merely a length of 11 parts of the principal scale divided into 10 equal parts. Each of these parts therefore equals $\frac{11}{10}$ of an inch, or .11 and the difference between a part of the scale and a part of the vernier is .01 inch. In the figure the zero of the vernier is made to coincide, *i.e.* to form one continued line with the division 30 on the scale, and consequently 10 on the vernier also coincides with 28.9 on the scale. Division 1 on the vernier is, from what we have said, .11 inch below zero of the ver-

nier, while the next lower division on the scale is only .10 below it: hence the vernier division 1 is .01 inch below the division 29.9 on the scale. For the same reason, division 2 on the scale is twice as much, or .02 below 29.8 on the scale, and so on, the divisions on the vernier overlapping those on the scale until 10 on the vernier stretches over to exact coincidence with 28.9 on the scale. Now suppose the vernier to be raised .01 inch, it is evident that division 1 of vernier will coincide with 29.9 on scale. If the vernier were raised .02 inch, the vernier division 2 would coincide with 29.8 on scale, and so on; so that in order to read off the hundredths of an inch which the vernier zero advances beyond any tenth in the scale, we have merely to see what vernier division comes nearest to a division of the scale, and set that down for the hundredth required.

This is the form which was given to the vernier by its inventor, in which the parts of the vernier are larger than those of the scale, and in which the numbering of the parts of the vernier runs contrary to the numbering of the scale. But if, as in No. 2, the vernier has the length of nine divisions of the scale, and this is divided into ten equal parts, each part will be equal to .09 inch, while the divisions of the scale are equal to .1 inch. The vernier in this form is to be numbered forwards, as well as the scale. It is clear that raising the vernier .01 will bring the division 1 of the vernier into coincidence, and so on, exactly as before; and therefore that the inches and tenths being read from the scale, the hundredths are to be taken from the vernier. The reading both scales forward is some advantage in favour of the latter mode, while the size of the vernier divisions is larger and consequently clearer in the first.

VERNON. [EURE.]

VERNO'NIA, a genus of plants named from W. Vernon, fellow of St. Peter's College, Cambridge, who collected many new plants in Maryland, inserted in the supplement to Ray's 'History.' The species are numerous, forming herbs or shrubs, in the tropical parts of the world, especially in Brazil; but several are found in India, and among them is that which is best known, *Vernonia anthelmintica*.

VERNONIA'CEÆ, a tribe of plants belonging to the natural order *Compositæ*. There are several genera of plants belonging to this tribe, which are chiefly inhabitants of America: there are a few in Asia and Africa, but none in Europe. The most interesting genus is the type of this tribe.

VERO'NA, a province of Austrian Italy, is bounded N. by the Tyrol, E. by the provinces of Vicenza and Padua, S. by those of Rovigo and Mantua, and W. by Mantua and the lake of Garda. The length of the province is about 50 miles from N. to S., and its greatest breadth is about 25 miles. The area is 1094 square miles, and the population in 1842 was 295,465. The northern part of the province is hilly, and even mountainous near the borders of the Tyrol: the highest summit of the Monte-Baldo ridge, which runs from the Alps of Roveredo in the Tyrol, close along the eastern shore of the Lago di Garda, is above 6000 feet high. The southern part merges into the great plain of the Po; but the territory of Verona does not touch that river, its southern boundary being marked by the Tartaro or Castagnaro, an affluent of the Adige. The farming in this province is bad; the chief products are rice, fruits, flax, hemp, olives, wine, &c. A good deal of silk is gathered. The minerals comprise copper, coal, potters' clay, marbles, alabaster, gun flints, &c. The river Adige crosses the province of Verona in its length from N. to S.S.E. It runs through a very narrow valley from the frontiers of the Tyrol down to the defile of Chiusa near Rivoli, after which it emerges into the plains of Lombardy. The province of Verona has few towns of any consequence besides the capital. *Legnago* is a fortress of considerable strength, on the Adige, S. of Verona; *Villafranca* is a bustling market-town on the road from Verona to Mantua; *Rivoli*, on the right bank of the Adige, N. of Verona, is famous for the battle won by Bonaparte and Massena over the Austrians, in Jan., 1797. On the eastern shore of the lake of Garda, are the towns of *Malsesine*, with an old gothic castle, and *Garda*, which last has given to the lake its modern name. In the mountains near Verona is the village of *Gargagnago*, where Dante lived some time as the guest of Can della Scala, and wrote part of his 'Purgatorio.' The valley of Ronca, 15 miles distant from Verona, is worth the notice of the geologist for its fossil fishes and shells. The natural bridge of Veja is also a remarkable object. (Valéry, *Voyages en Italie;* Denina, *Quadro Istorico Statistico dell' Alta Italia;* Serristori, *Statistica dell' Italia;* Persico, *Descrizione di Verona, e delle sue Provincie.*)

VERO'NA, the chief town of the province of Verona, and, since 1849, the capital of Austrian Italy, is situated in 45° 26′ N. lat., 11° E. long., on the Adige, which divides the town into two parts, and at the foot of hills which are the lower offsets of the mountains of the Tyrol. The situation of Verona is pleasant and healthy; the town, which is substantially built with long and tolerably wide streets, is surrounded by old walls flanked with towers, and retains much of the appearance of a town of the middle ages. The ramparts and bastions constructed by the architect and engineer San-Micheli in the early part of the 16th century, were destroyed according to one of the conditions of the peace of Luneville in 1801, but since the late war with Sardinia, the fortifications have been completely restored. Among the many remarkable buildings of Verona the most worthy of notice are—the splendid palace Canossa, built by San-Micheli; the palace called della Gran Guardia in the Piazza di Brà; the elegant palace Guasta Verza by San-Micheli; the palace Bevilacqua, whose once rich museum has been dispersed: the finest of its ancient sculptures are now at Münich. The palace Ridolfi has a curious representation of the cavalcade of Pope Clement VII. and Charles V. on the occasion of that emperor's coronation at Bologna. The palace del Consiglio is built on the design of Sansovino, but its spacious hall was constructed by Frá Giocondo the commentator of Vitruvius. The custom-house is a noble building

raised in the last century by Count Alessandro Pompei. The churches of Verona are numerous, and many of them interesting for their monuments and paintings. The church of SS. Nazario e Celso is said to be of the seventh century. The subterranean galleries in its neighbourhood were once used as catacombs. The church of San-Zenone, dates from the 9th century: its bronze gates, and a statue of the saint and his tomb, and its curious emblems, arabesques and figures, attest its antiquity. The cathedral of Verona, a gothic building, said to be of the age of Charlemagne, with its façade covered with old sculptures of men and animals, contains the tomb of Pope Lucius III., who died at Verona in 1185, several valuable paintings, a sepulchral monument of the Roman times bearing the names of Julius Apollonius and his wife Attica Valeria, and other interesting objects. The church of San-Fermo has a fine mausoleum of the Turriani family, many other beautiful monuments, and also several very old paintings, one of which, by an unknown artist, is said to be anterior to the time of Cimabue. The churches of Santa Maria della Scala, San-Giorgio Maggiore, and San-Sebastiano, are among the finest churches of Verona, and are rich in paintings. The library of the Chapter of Verona is very ancient: it contains 12,000 volumes and about 540 MSS., among which is a palimpsest of the Institutes of Gaius. It was in the same library that Petrarch discovered Cicero's Epistles 'ad familiares.' The Teatro Filarmonico of Verona is a handsome structure; in the court and under the portico is Maffei's collection of Etruscan and other inscriptions, and of ancient bassi-rilievi. The sepulchral monuments of the Della Scala family in the shape of pyramids, surmounted by the equestrian statues of the various members of that family who were lords of Verona, are remarkable objects. The pretended tomb of Juliet is still visited by credulous travellers. The amphitheatre of Verona, one of the best preserved monuments of its kind, is noticed under AMPHITHEATRE. Another classical monument, the Arco de' Gavii, the sepulchre of an ancient family, was pulled down in 1805. The gate De' Borsari is said to have been built by the Emperor Gallienus. The handsome modern gate called 'Porta del Palio' is the work of San-Micheli. Remains of an ancient theatre have been discovered. Four bridges cross the Adige at Verona: that called Di Castelvecchio is remarkable for the width of the central arch. Verona gives title to a bishop; it is the head-quarters of the Austrian army in Italy, and the residence of the supreme civil and military governor of Austrian Italy, to whom the civil and military governors of the Venetian provinces and Lombardy, respectively resident in Venice and Milan, are subordinate. Among the educational establishments of the city are a lyceum, a college for young women, a school of drawing and painting, an academy of agriculture and commerce, and a clerical seminary. The population amounts to about 60,000. A railroad runs from Verona, through Vicenza and Padua to Venice. Raw silk, rice, wool, timber, and leather are the chief articles of commerce: woollen, silken, and linen stuffs are manufactured, and also paper, soap, jewellery, &c. (Saraina, Maffei, and the other historians of Verona; Valéry, *Voyages en Italie.*)

VERONE'SE, ALESSANDRO, was born at Verona about 1582. His family name was Turchi or Turco. Having shown some talent for drawing, the painter Felice Brusasorci took him as a colour-grinder in his studio, and encouraged him. He soon surpassed his master, and, after the death of Brusasorci, in 1605, completed some of his unfinished works. He afterwards went to Venice, and obtained employment there from Carlo Saracino. He ultimately established himself in Rome, where he formed a style which combined many of the beauties of the Roman and the Venetian schools. His principal works are in Verona, and of these a Pietà and the Passion of the Forty Martyrs are among the best. Alessandro died at Rome, according to Pozzo, in 1648, but Passeri says he did in 1650.

VERONESE, PAOLO. [CAGLIARI, P.]

VERO'NICA, a genus of plants belonging to the natural order *Scrophulariaceæ*. The Flora of Great Britain contains about 20 species. *V. spicata*, Spiked Speedwell, is a native of Germany, France, and Switzerland, and is found in England, in some parts of the county of Suffolk. *V. officinalis*, Common Speedwell, is a native of Europe and North America, in woods and on dry sandy banks, and is plentiful in Great Britain. It has pale blue-coloured corollas with veins of a deeper blue. *V. Beccabunga*, Brooklime, is a glabrous shining plant, native of every country in Europe, and is also found in North America and Nepaul, and is abundant in Great Britain. It grows in ditches, rivulets of clear water, and in running streams. It has racemes of deep-blue flowers marked with veins of red. *V. montana*, Mountain Speedwell, is a native of Europe, but is not very common in Great Britain. It is generally found in woods and groves on a calcareous soil, but not always in mountainous districts, as its name would infer. *V. chamædrys*, Germander Speedwell, is sometimes known by the name of Bird's-Eye, and is often mistaken for the Forget-Me-Not. *V. Teucrium*, Germander-Leaved Speedwell, is a native of Italy, Switzerland, and Germany in clayey soils. *V. longifolia*, Long-Leaved Speedwell, is a native of the Continent of Europe and Siberia. It is very changeable in its characters, and a great number of varieties have been recorded. *V. decussata*, Cross-Leaved Speedwell, is a native of the Falkland Islands and the Straits of Magalhaens, and with care may be cultivated in the open air in this climate.

VEROVICZ. [SLAVONIA.]

VERRI, PIE'TRO, born at Milan, of a noble family, in 1728, studied at Rome and at Parma, after which he obtained a commission in an Italian regiment in the Austrian army, and served in Saxony in the war between Austria and Prussia. After the peace he returned to his native country, and was made a member of the Council of Economy instituted by Maria Theresa for the duchy of Milan, in 1765. He took an active part in the administrative and financial reforms which

were effected about that time, and wrote several works upon subjects of political economy, namely, 'Memorie sull' Economia Pubblica dello Stato di Milano,' 'Riflessioni sulle Legge Vincolanti,' in which he advocated freedom of commerce; and 'Meditazioni sull' Economia Politica.' He also wrote 'Storia de Milano,' down to the conquest of Charles V., published after his death, and some miscellaneous works. He continued in office in the economical administration of the duchy of Milan till 1786, when he retired to private life. When the French invaded Lombardy in 1796, Verri was appointed a member of the municipal council of Milan. He died of apoplexy in June, 1797.

VERRI, ALESSANDRO, younger brother of Pietro, is chiefly known for a work, partly imaginative and partly historical, entitled 'Le Notti Romane al Sepolcro dei Scipioni.' He died in 1816.

VE'RRIO, ANTO'NIO, was born at Lecce about 1639, and after he had made some progress in painting, he visited Venice and Naples, and at the latter place, in 1660, he painted in fresco Christ healing the Sick, in the college of the Jesuits. He afterwards went to France, and painted the high altar of the Carmelites at Toulouse. Shortly after this, Charles II. invited Verrio to England and intrusted to him the decoration in fresco of Windsor Castle. He painted most of the ceilings of the palace, one side of St. George's Hall, and the chapel, and likewise the great staircase at Hampton Court. But few of his works are now left. Verrio was paid enormously for these and many other works which he painted in England. After the accession of James II. he was again employed at Windsor in 'Wolsey's Tomb-House,' then destined for a Roman Catholic chapel. He also painted James and several of his courtiers in the hospital of Christchurch, London: he painted likewise at St. Bartholomew's Hospital. After the Revolution he refused to paint for William III. He executed however the extensive works for Lord Exeter at Burleigh House, which are considered Verrio's best productions, and he painted also at Chatsworth and at Lowther Hall. Queen Anne granted him a pension of 200*l.* a year, but he did not enjoy it long. He died at Hampton Court in 1707. Walpole has described Verrio's artificial and insipid style with great piquancy.

VE'RRIUS FLACCUS, a freedman, and a Roman grammarian of the time of Augustus, who appointed him instructor to his two grandsons, Caius and Lucius, the sons of Agrippa. He had an annual salary of one hundred sestertia. He died under Tiberius, at an advanced age. At Prænestе a statue was erected to him in the lower part of the forum, opposite the Hemicyclium, which contained on large marble plates the Fasti, which Verrius Flaccus had drawn up for the Prænestines. (Sueton., 'De Illustr. Grammat.,' 17.) These Fasti are the so-called 'Fasti Prænestini,' of which considerable fragments were discovered in 1770, and published by P. F. Foggini, Rome, 1779, fol. Flaccus was the author of several other antiquarian and grammatical works, which were highly valued. An abridgment of his work 'De Verborum Significatione' was made by the grammarian S. Pomponius Festus, and this was again abridged in the time of Charlemagne in such a manner that the original character of the work was altogether destroyed. These wretched abridgments have, as in many other instances, caused the loss of the original work. (K. O. Müller, 'Præfatio ad Festum,' p. 12, &c.) We still possess numerous fragments of the works of Verrius Flaccus, besides the 'Fasti Prænestini' and the abridgment of his work 'De Verborum Significatione.' They are collected in the work of Foggini above referred to; in Dacier's edition of Festus (i., pp. 14–27, ed. London, 1826); in E. Egger's 'Scriptorum Latinorum nova Collectio,' vol. ii.; and in Lindemann's edition of Festus, pp. 293-299.

VERRO'CCHIO, ANDRE'A DEL, was born at Florence in 1432. He was, according to Baldinucci, a scholar of Donatello. He first distinguished himself as a goldsmith, both at Florence and at Rome; he then devoted himself solely to sculpture in bronze and in marble. One of his best works is the Incredulity of St. Thomas, in the church of Or San-Michele, at Florence, finished in 1483. In this work, says Vasari, Verrocchio left nothing to be wished for; and having attained perfection in sculpture, he began to turn his attention to painting. Vasari mentions many designs and cartoons by Verrocchio, some of which were copied and imitated by Lionardo da Vinci. Bottari says that Verrocchio was one of the first who made plaster casts from living and dead subjects, but not the first, as Vasari states. Verrocchio also assisted Orsino in his wax figures; and with his other accomplishments he combined a good knowledge of geometry and great practical skill in music. He died at Venice in 1488.

VERRUCA'RIA, a genus of plants belonging to the natural order of Lichens, and to the tribe Pseudo-Lichens of the arrangement of Acharius.

VERSAILLES, capital of the department of Seine-et-Oise, in France, 11 miles by railway W. from Paris, is situated in 48° 48′ N. lat., 2° 7′ E. long., and has 35,412 inhabitants. It was a mere village in the time of Louis XIII., who built here a hunting-seat, which Louis XIV. converted into the most magnificent palace in Europe. Under this prince (from 1672) and Louis XV. and XVI. it was the ordinary residence of the court; and the village of Versailles grew into a handsome city. The town is divided into two nearly equal parts by a noble avenue, nearly half a mile long, running east and west, planted with four rows of elms, forming three alleys, with a total breadth of at least 288 feet. The centre alley, which is paved, forms part of the high road to Paris, and enters the town on the east, affording the traveller a view of the palace, which faces the avenue at its western extremity. Versailles itself is divided by the avenue into Old Versailles, on the south side, and the Quarter of Notre Dame on the north; the two parts however are equally modern, and consist of straight streets crossing each other at right angles, forming one of the best-ventilated cities in Europe.

Besides the avenue of Paris, two other avenues, that of St. Cloud on the right, and that of Sceaux on the left, converge on the Place d'Armes, which is at the western end of the Avenue de Paris, immediately in front of the palace. These avenues are planted with fine elms, and lined with pleasant residences. Besides these avenues, there are several boulevards, also planted with elms, and bordered with neat buildings. There are several open spaces: the Place d'Armes is the largest of these; the Place Hoche, which is adorned with a fine bronze statue of General Hoche, is the handsomest. There are two market-places, one in Old and one in New Versailles; and the city is adorned with several handsome fountains.

The centre of the town front of the palace is formed by the building of Louis XIII. This has a centre and two wings advancing at right angles from the centre, so as to enclose three sides of a court, which is open on its fourth or east side towards the Place d'Armes. The central and principal part of the palace of Louis XIV. forms three sides of a quadrangle, sufficiently large to envelop in its enclosure the older palace of Louis XIII., so that the two palaces stand back to back, that of Louis XIII. fronting the town, and that of Louis XIV. fronting the garden. The central part of the latter, which incloses the older palace, presents three fronts to the garden, namely, the principal front and two side-fronts. The garden front is more than 1900 feet in length. It is adorned with Ionic columns, eighty-six in number, arranged in fifteen colonnades of four, six, or eight columns, each colonnade supporting a cornice crowned with as many statues as there are columns. This palace was built from the designs of J. H. Mansard.

Immediately in front of the palace, on the west side, is the garden or little park, an irregular polygon about 3 miles long from the palace to its western extremity, and about two miles broad. It is included in the limits of the great park, which is estimated to be from 20 to 25 miles in circuit. The garden was laid out by Le Nôtre, in terraces, parterres, and alleys, adorned with a profusion of statues, vases, and other sculptures; with a canal in the shape of a cross, and other pieces of water of the same formal character, and a number of fountains, which are supplied with water from the Seine by a forcing-pump, substituted for the former water-works, aqueduct, and reservoirs of Marly. The fountains play on the first Sunday of every month during summer, and on certain holidays; these exhibitions always attract a multitude of spectators from Paris. The orangery is remarkable for the number and beauty of the orange-trees which it contains.

The interior of the palace was magnificently fitted up and decorated by Louis XIV. After the first Revolution, the building was neglected. By the munificence of the late king, Louis Philippe, the palace was thoroughly repaired, and converted into a national historical museum of sculpture and painting, which was opened to the public on the occasion of the marriage of the late Duke of Orleans, June 10, 1837. Adjacent to the north wing of the palace, on the town side, are the chapel and the opera-house; the former remarkable for its architectural beauty, its decorations, and its many historical recollections.

In the park of Versailles are the two royal country-houses of the Grand Trianon, and the Petit Trianon, with their respective gardens. The Grand Trianon was built by Louis XIV.; the Petit Trianon by Louis XV. The 'English garden,' which is the great attraction of the Petit Trianon, was formed by the orders of Marie Antoinette. In the Place d'Armes, opposite to the town-front of the palace, are two ranges of stables of great extent. There are near the palace various other buildings, as the Grand Commun, a heavy building, which had a thousand sleeping-rooms, and is now an hospital. To the south-east and south of the palace are the kitchen-garden and a very large piece of water called 'La Pièce des Suisses.' The former mansions of the grand-master of the king's household, and of the chief huntsman, are now converted respectively into the town-hall and the court-house; the former Garde-Meuble is now the prefect's office. The Tennis Court, famous for the oath taken in it by the National Assembly, June 20, 1789, was for many years the studio of Horace Vernet, who executed here all those of his paintings that adorn the palace collection. Since the revolution of 1848 it has become national property, and is now shut up. Versailles has two churches, namely, the cathedral of St.-Louis and the church of Notre-Dame. There is also a beautiful chapel attached to the college, and a parish church in the suburb of Montreuil. The general hospital is one of the finest in France; and there are an ecclesiastical school, a primary normal school, a public library of 42,000 volumes, a museum, an agricultural society, a theatre, several barracks, and a prison.

Versailles has a good corn-market, manufactures of fire-arms, files, clocks and watches, jewellery, cotton-yarn, net, pasteboard, starch, hats, hosiery, wax candles, earthenware, and glass. There are breweries and tan-yards, and a number of nursery-grounds.

Versailles gives title to a bishop, whose diocese is the department of Seine-et-Oise.

VERTEBRA. [Skeleton.]

VERTEBRATA, the principal grand division of the animal kingdom, including all which present us with a true skull enclosing a brain, and a vertebral column defending a spinal chord. [Animal; Mammalia; Birds; Reptiles; Fish.] Blood, red; heart, muscular; limbs, never exceeding four, often wanting; sexes, separate.

VERTEX, a name given to any remarkable or principal point, particularly when that point is considered as the top or summit of a figure. Thus we have the three vertices of a triangle, the vertex of a cone or pyramid, &c.

VERTICAL. The zenith being considered as a vertex, which in fact it is, when the word vertex means summit, a vertical plane is one which passes through the line drawn from the spectator to his zenith; a vertical plane therefore merely means one which is perpendicular to the horizon, and a vertical line has the same meaning.

VERTICILLUS, in Botany, a term applied to

the arrangement of flowers and leaves around the axis.

VE'RTIGO, or Giddiness, is a peculiar sensation, depending probably on some disturbance of the circulation in the brain.

As a sign of disease, vertigo by itself indicates very little. No judgment can be formed from it, except by taking it in connection with the other characters of the affection of which it is a part, and these will generally be sufficiently indicative. Its most common cause is some disturbance of the digestive organs, and it may be safely treated in that view, except in those who are prone to apoplexy or other cerebral disease, when it must be always regarded with fear, and requires extreme caution.

VERTOT, RENÉ AUBERT DE, the second son of a poor Norman gentleman, was born on Nov. 25 1655. He studied in the Jesuits' College at Rouen and joined the order of the Capuchins in the convent at Argentan. But the rigour of the order undermining a constitution naturally delicate, he was persuaded to join a less ascetic order; and the pope's dispensation having been obtained, he entered the Premonstrant Abbey at Valery. He soon afterwards obtained the cure of Croissy-la-Carenne, near Marly, and retiring to it, devoted himself to the discharge of his spiritual duties and literary pursuits.

His first publication was his 'Histoire de la Conjuration de Portugal,' which was published in 1689. He was now advanced, first to a cure in the Pays de Caux, and then to a richer living near Rouen. His next work was his 'Histoire des Révolutions de Suède.' When, in 1701, the king re-organised the Academy of Inscriptions and Belles-Lettres, Vertot was nominated Académicien Associé. In 1705 he was appointed Académicien Pensionnaire. From this date his contributions to the Annals and Memoirs of the Academy are frequent. These occupations did not divert Vertot from his favourite topic—the Revolutions of the Roman Republic. This history, which appeared in 1719, was still more favourably received than its predecessors. The reputation of Vertot induced the Order of Malta to invite him to become its historian. He complied and published, in 1726, his 'Histoire des Chevaliers Hospitaliers de St. Jean de Jerusalem.' Vertot died in the Palais Royal, Paris, June 15, 1735.

VERTUE, GEORGE, was born in London, in 1684, of parents more honest than opulent. At about the age of thirteen he was placed with a Frenchman, who was the principal engraver of arms in London at that time; and he afterwards spent two years at home, which he devoted to the study of drawing. He then engaged himself with the engraver Michael Vandergucht, and in 1709 he set up for himself. During the reign of Anne, Vertue was chiefly employed upon portraits after Kneller, and others. He commenced early in the reign of George I. to make his researches for his 'History of the Arts in England.' Heneage Finch, Earl of Winchelsea, who was president of the Society of Antiquities in 1717, appointed Vertue, who was a member, to be its engraver; and he executed nearly all the prints which were published by that society during the remainder of his life. He was also very extensively employed by rich and noble patrons. In 1730 he published a set of twelve English Poets, and afterwards engraved some of the portraits for the translation of Rapin; but was superseded by Houbraken, who engraved better, but who was less scrupulous as to the genuineness of his originals. He died July 24, 1756.

Walpole's 'Anecdotes of Painting in England,' was written entirely from manuscripts which he bought of Vertue's widow. Vertue commenced his compilations in 1713, and they amounted in the whole to nearly forty volumes, large and small. Walpole has given a complete list of Vertue's prints, in his 'Catalogue of Engravers.'

VERUS, LU'CIUS, a Roman emperor, who reigned as the colleague of Marcus Aurelius, from A.D. 161 to 169. He was a son of Ælius Verus, who had been adopted by the Emperor Hadrian and raised to the rank of Cæsar. After the death of Ælius Verus, in A.D. 138, Hadrian adopted T. Aurelius (Antoninus Pius), on condition that he should adopt Marcus Verus (Marcus Aurelius), the son of Annia Faustina, and Lucius Verus, the son of Ælius Verus. After the death of Antoninus Pius, in A.D. 161, Marcus Aurelius, who succeeded him, voluntarily shared his imperial dignity with his adoptive brother L. Verus, who was then about thirty-two years old. Verus had been educated by the most distinguished grammarians and philosophers of the time, but he had no taste for intellectual occupations. So long as he was under the direct influence of M. Aurelius, his vicious character did not fully disclose itself. In A.D. 162 L. Verus took the field against the Parthians, but instead of conducting the war in person, he left it to his generals, who gained victories, while the Emperor revelled in debauchery, with which he became familiar in the towns of Asia, especially at Antioch. In A.D. 164 he went to Ephesus, where he celebrated his marriage with Lucilla, the daughter of his adoptive father, or, according to others, of his adoptive brother. After the close of the war he returned to Rome, accompanied by hosts of actors, freedmen, and low persons, who ministered to his vulgar pleasures, and in A.D. 166 he and Marcus Aurelius solemnised a triumph over the Parthians. Soon after this Rome was visited by a fearful pestilence, and at the same time the Marcomanni and Quadi invaded the empire from the north. Both the emperors, at the head of their armies, marched to Aquileia. Verus took scarcely any part in the war, but as usual gave himself up to his pleasures. When hostilities had ceased, the two emperors returned to Rome. On his way thither L. Verus was seized with a fit of apoplexy at Altinum, in the neighbourhood of Venice, where he died, A.D. 169, in the forty-second year of his age. There is a marble bust of Verus in the British Museum.

VERVAIN. [VERBENA.]

VERVIERS. [LIE'GE.]

VERVINS. [AISNE.]

VESA'LIUS, AN'DREAS, was born at Brussels in 1514. He received his classical and philosophical education at Louvain, and gained an unusual knowledge in physics. He next studied

medicine at Montpelier and Paris. In 1526, Guntherus made him his chief assistant; and in the same year he discovered the origins of the spermatic blood-vessels. In 1535, in order that he might obtain better opportunities for study, he joined the army of the Emperor of Germany, who was then at war with France. In 1538 he was at Bologna, and in 1539 at Pavia, where, in 1540, he was appointed professor of anatomy, having not long before published his celebrated 'Epistola docens Venam Axillarem Dextri Cubiti in Dolore Laterali secandam,' Basel, 1539, 4to. In 1543 he held the same office at Bologna; and not long afterwards he was appointed professor of anatomy at Pisa. He had in 1539 published some anatomical plates; and for the four succeeding years he gave a great portion of his time to the preparation of a complete work of the same kind, employing as his assistants some of the most skilful artists of the day. In 1543 he published his great work 'De Corporis Humani Fabrica Libri Septem,' Basel, 1543, folio. This work, which overthrew without ceremony the doctrines of Galen and the ancients, drew upon the author a host of opponents. But in spite of the opposition of his contemporaries, the fame of Vesalius greatly increased after the publication of this and several works which he wrote in support of his system. About 1544 the emperor Charles V. appointed him his chief physician; and he was gradually obliged to be so constant in his attendance on the court of that prince, and afterwards of Philip II. of Spain, that anatomy was almost entirely neglected.

In 1563, or the beginning of 1564, Vesalius suddenly left Madrid and the court, and went on a pilgrimage to Jerusalem. Whatever might have been his reasons for this act, its end was most disastrous. While he was at Jerusalem, in 1564, Fallopius died, and the Venetian senate invited him to the vacant professorship of anatomy. On his voyage to Padua, his vessel was wrecked on the isle of Zante, and there Vesalius died of starvation, according to the accounts of some, but it seems more probable of fatigue and exposure.

The whole of Vesalius's works, which are numerous, were edited by Boerhaave and Albinus, at Leyden, in 1725, in 2 vols. folio. Portal's 'Histoire de l'Anatomie et de la Chirurgie,' t. i., p. 394, and Haller's 'Bibliotheca Anatomica,' t. i., p. 180, contain, together with the Life of Vesalius, analyses of his chief works.

VESICATORY. [BLISTER.]

VESOUL. [SAÔNE, HAUTE.]

VESPASIA'NUS, TITUS FLA'VIUS, was born near Reáte, in the Sabine country, on the 17th of November, A.D. 9. He served in Thrace as military tribune, and having held the magistracies of ædile and quæstor, in the latter of which he had for his province Crete and Cyrenaica, he became prætor in the reign of Caligula, A.D. 39. About this time he married Flavia Domitilla, by whom he had two sons, Titus and Domitianus, who were successively emperors.

In the reign of Claudius he had a command in Germany (A.D. 41-42). He afterwards served with distinction in Britain under Aulus Plautius (A.D. 43), and under Claudius himself. He was consul suffectus in A.D. 51. He afterwards governed Africa as proconsul, in the reign of Nero, where instead of enriching himself, he much impaired his fortune. In A.D. 67 he accompanied Nero in his tour through Greece; but he got into disgrace, it is said, by falling asleep or leaving the room during one of the emperor's poetical exhibitions. However, when the Jews revolted, Nero gave him the command in the Jewish war with an army of three legions. In less than two years he had conquered the whole of Judæa except Jerusalem, when he was persuaded by his son Titus, and by Mucianus, the proconsul of Syria, to assert his claim to the imperial throne, which had been already marked as his by repeated omens. Vespasian was proclaimed emperor at Alexandria, on the 1st of July, A.D. 69, and his cause was espoused by the legions of Judæa and Syria, by three legions in Moesia, and by two in Pannonia. The legions of Moesia and Pannonia were brought over by Antonius Primus, who marched into Italy. Vitellius was betrayed by Cæcina, the consul suffectus, and his army, though superior in numbers to that of Antonius, was routed by the latter in a battle between Bedriacum and Cremona. Antonius marched to Rome, Vitellius was put to death, and the authority of Vespasian was established.

The emperor now proceeded to Rome, leaving the reduction of Jerusalem to his son Titus. He arrived in the city at the end of the summer of the year 70 A.D., the Senate having in the mean time appointed him, with his son Titus, to the consulship, and conferred upon him all the accustomed imperial honours. He restored the privileges of the Senate, reformed the courts of justice, restored discipline to the army, and order to the finances. He repaired the devastations which Rome had suffered in the recent civil wars, and adorned the city with many new buildings. He began or completed the restoration of the Capitol, the temples of Peace and of Claudius, and the Amphitheatre called the Colosseum.

Temperate in his own habits, he exerted himself to restrain luxury in his subjects. He was affable to his friends, and even suffered severe strictures on his conduct to pass unpunished. He was fond of money, but what he exacted from his subjects he spent on public works, not on his own pleasures. He was a liberal patron of literature and art.

The reign of Vespasian was signalised by great military successes, of which the most important were the victories of Petilius Cerealis over the Tréviri (A.D. 70), those of Agricola in Britain, and the conquest of Jerusalem. [TITUS.] In A.D. 72 the kingdom of Commagéne was taken from Antiochus and added to the Roman Empire.

Vespasian died of a fever, on the 23rd of June, A.D. 79, in the 70th year of his age and the 10th of his reign.

(Tacitus, *Histor.*; Suetonius, *Vespasian.*)

VESPERTILIONIDÆ (*Bats*). [CHEIROPTERA.]

VE'SPIDÆ (*Wasps*). The insects of the order *Hymenoptera*, composing the genus *Vespa* of Linnæus, of which the common Wasp and the

Hornet are familiar examples, were formed into a family by Latreille, under the name of *Diploptera*, afterwards changed into *Diplopteryga* by Kirby. They form the third and last division of the first subsection (*Prædones*) of the second section (*Aculeata*) of *Hymenoptera*, in Westwood's revision of Latreille's arrangement. The wings of all the insects of the family have a similar neuration, their eyes are lunate, and there are glands at the extremity of the labrum. The forewings have one marginal and three perfect submarginal cells, with an incomplete terminal submarginal cell. [Wasp.]

VESPUCCI, AMERI'GO, was born March 9, 1451, at Florence. Mercantile avocations led him to Spain, and he seems to have been a factor in the wealthy Florentine house of Juanoto Bernardi, at Seville, in 1486. On the death of Juanoto Bernardi, in 1495, he was placed at the head of the factory.

In the narrative attributed to Vespucci, published at St. Dié, in Lorraine, in 1507, and republished at the same place in 1509, he is said to have made four voyages: two under the auspices of the king of Castile, in 1497 and 1499; two by command of the king of Portugal, in 1501 and 1503. The first has been alleged to be apocryphal by some warm supporters of the claims of Columbus to be the original discoverer of the mainland of America, as well as of the islands, who have not scrupled to attribute to Vespucci a fraudulent attempt to arrogate to himself the honour due to Columbus. Humboldt, in the fourth volume of his 'Histoire de la Géographie du Nouveau Continent,' has successfully vindicated Vespucci from this imputation, and proved that there is every reason to believe that the voyage really was made, though at a later date than appears in the printed book. Vespucci appears to have served, in all the expeditions he was engaged in, in the capacity of astronomer. In 1507 he was intrusted with the victualling and furnishing of a royal fleet fitted out by Spain in that year. On March 22, 1508, he obtained the appointment of piloto-mayor, which he retained till his death, at Seville, Feb. 22, 1512.

VESTA (Ἑστία or Ἰστίη), one of the divinities, common both in name and mode of worship to the Greeks and Romans. According to Hesiod, she was the first-born daughter of Cronos and Rhea, and sister of Zeus; the Romans made her the daughter of Saturn and Ops. She was a maiden divinity.

Vesta was the goddess of the hearth, and as the hearth was the centre of the family, where the members met, conversed, and took their meals, Vesta was regarded as the goddess of domestic union. Strangers and friends were hospitably received at the hearth; suppliants sought safety and protection there. The fire on the domestic hearth was also regarded as the symbol of Vesta herself. Each political community, city, or state, had its public hearth or altar of Vesta, on which a perpetual fire was kept burning. When a state sent out colonists, they took from the hearth of the metrópolis (the Greek name for the parent city) the fire which was to blaze on the public hearth of the colony. Larger communities than a mere town or city had likewise their public hearth and centre of union. Thus the common hearth of the Greeks was at Delphi, and that of the Latins at Lanuvium.

In Greece Vesta had few temples, because every house and every Prytaneum was regarded as her sanctuary. But at Hérmione in Árgolis she had a temple, though, like her temple at Rome, it contained no image of the goddess. The temple of Vesta at Rome was round, and stood in the Forum. It was open during the day. The temple contained the altar of the goddess, on which burned the eternal fire. [Vestal.]

VESTA. [Planets, Small.]

VESTAL (Virgo vestális), a priestess of Vesta. The number of these priestesses, according to the regulations of King Numa, was four, two for each of the ancient tribes. Servius Tullius, or, according to others, Tarquinius Priscus, added two more, to represent the third tribe, or Lúceres. In the earliest times they were chosen by the kings, but afterwards by the Pontifex Maximus, who drew by lot one out of twenty select virgins in the assembly. Parents had no right to oppose their daughter being devoted to the service of the goddess, except in three cases: first, if one of her sisters was already a vestal; secondly, if the parents had no more than three children; and, thirdly, if the father held one of certain high priestly offices. There were also certain conditions of qualification for the office of a vestal. A vestal must not be younger than six nor older than ten years, when chosen. From the moment that a vestal virgin was chosen and taken to the atrium of Vesta, she was emancipated from her father's power. A vestal virgin was obliged to serve the goddess for thirty years, at the end of which time they might unconsecrate (exaugurare) themselves, and marry. These virgin priests enjoyed at Rome the highest distinctions. They had an official residence in the Via Sacra, and an allowance.

The duties of the vestals were to keep the fire burning on the altar of Vesta, and to do other things connected with the worship of Vesta. They had also other duties to perform; as to prepare the sacrifices on certain occasions. If the sacred fire was ever extinguished through the carelessness of a vestal, she was scourged by the Pontifex Maximus. The vestals were bound to maintain their chastity, and incontinence was punished with death. The guilty vestal was placed alone in a subterraneous vault with great solemnity, and the tomb was closed and covered over with earth.

VESTRY is that part of a parish church where the ecclesiastical vestments are kept; and inasmuch as meetings of parishioners have been usually held in this part of the church for parochial purposes, such meetings, duly convened, have acquired the name of vestries. Even where a building remote from the church has been erected for parochial meetings, it is usually called the *vestry-room*. When the meeting is held in the church, or even in a building within the precincts of the churchyard, the ecclesiastical courts claim jurisdiction over the conduct of the parishioners.

By the common law all rated inhabitants of a

parish have a right, either periodically or when specially convened, to meet in vestry on the affairs of the parish, and to vote the necessary pecuniary rates. But this common law right has been modified in many ways.

1. By custom, which has vested the government of some parishes in a select and usually a self-elected body of persons. The principal act for the regulation of these vestries is the 58 Geo. III., c. 69.

2. Section 20 of the act 10 Anne, c. 11, gives to the commissioners appointed by that act (for the purpose of erecting fifty new churches in London and its neighbourhood) power to appoint, under their seals, with the consent of the ordinary, 'a convenient number of sufficient inhabitants, in each parish created under the act, to form a select vestry of such parish.' It vests in the majority of such select vestry the power to supply vacancies, and gives them all the powers of other vestries. The 59 Geo. III., c. 134, another church-building act passed to explain and amend the act of the previous session, gives a similar power (s. 30) to the commissioners under those two acts to appoint, with the like consent, a select vestry; and the 10th section of the act 3 Geo. IV., c. 72, confines the powers of the vestryman to his own district with respect to ecclesiastical matters, and provides that any deficiency in the select vestry shall be supplied as vacancies have heretofore been filled up in the vestries of the particular parish. Local acts have also created vestries.

3. The 59 Geo. III., c. 12 (Sturges Bourne's Act), enables general vestries to appoint special vestries, consisting of not more than twenty parishioners or fewer than five, to superintend the relief of the poor, the overseers of the poor being placed under their authority.

4. A fourth kind of vestry is created by 1 and 2 Wm. IV., c. 60 (Sir John Hobhouse's Act). The adoption of this act is left to the discretion of each particular parish; but rural parishes of less than 800 rated householders are excluded from its operation.

It is the duty of vestries to provide funds for the maintenance of the edifice of the church and the due administration of public worship; to elect churchwardens; to present for appointment fit persons as overseers of the poor; to administer such estates and other property as belong to the parish; and in some cases, under local acts, to superintend the paving and lighting of the parish, and to levy rates for those purposes.

The remedy for neglect of duty by a vestry is a mandamus from the Court of Queen's Bench, directed to the officer whose duty it would be to perform the particular act, or in some cases by an ordinary process against him, or by a process against the churchwardens out of the ecclesiastical courts. By the act 13 and 14 Vict., cap. 57, vestries are not to be held in churches, and the same act regulates the appointment of vestry-clerks.

VESU'VIUS (written also by the Roman poets *Vesévus* and *Vesvius*), a mountain about 6 miles E. from the city of Naples, celebrated for many centuries as one of the principal and most active volcanoes of Europe. Its height above the sea is variable, according to the condition in which eruptions leave the crater. By the violent eruptions of October, 1822, the top was left as a vast elliptical gulf or chasm three miles in circumference, and perhaps 2000 feet in depth. More than 800 feet of the summit of the ancient cone were carried away by the explosions, and the height of the mountain was thus reduced from 4000 to 3200 feet.

The history of the eruptions of Vesuvius has been traced by several writers, especially Dr. Daubeny, in his 'Treatise on Volcanoes,' and Mr. Lyell, in his 'Principles of Geology.' It does not appear that any record exists of an actual eruption of Vesuvius prior to the Christian æra. In the month of August, A.D. 79, occurred the first and perhaps the greatest of all the recorded eruptions of Vesuvius, described in the letter of Pliny the Younger to Tacitus, which records the death of Pliny the naturalist. The cities of Stabiæ, Pompeii, and Herculaneum were overwhelmed by showers of cinders and loose fragments, no lava having been ejected on this occasion. Other eruptions succeeded in A.D. 203, 472, 512, 685, 993, and 1036, which last is said to be the first which was attended by an ejection of lava. Eruptions were renewed in 1049, 1138, 1306, 1500, 1631, 1660, 1682, 1694, and 1698, from which time to the present eruptions have occurred very frequently, so as seldom to leave any interval of rest exceeding ten years. Sometimes this mountain has flamed twice within a few months. The eruption of 1737 gave forth lava currents which passed through Torre del Greco into the sea, the solid contents being estimated at 33,587,058 cubic feet. In 1794 the lava followed the same course, and amounted to 46,098,766 cubic feet.

VETCHES. [TARES; VICIEÆ.]

VEVAY. [VAUD.]

VEZE'RE. [CORRE'ZE.]

VIAREGGIO. [LUCCA.]

VIATKA (Wjatka), an extensive government in Asiatic Russia, is situated between 55° 50′ and 60° 5′ N. lat., 47° and 54° E. long. Its area is 52,900 square miles, and the population 1,662,800. It is bounded N. by Vologda, E. by Perm, S. by Orenburg and Casan, and W. by Costroma. The country is covered by branches of the Ural Mountains and by morasses, some of which are many square miles in extent, and there are also large forests. The climate is cold. The soil is in general clay, with no considerable tract of rich soil, except on the banks of the Kama, a feeder of the Volga, which rises in the north part of the government. The principal river is the Viatka, which rises near the source of the Kama, and with various windings traverses the government from north to south, and falls into the Kama at the south-western corner of the province. It receives in its course several considerable rivers. Agriculture is the chief occupation of the inhabitants. The kinds of grain cultivated are rye, barley, and oats, and a little wheat; pulse of different kinds are grown, and flax and hemp sufficient for the consumption of the inhabitants.

The forests, chiefly consisting of pines, oaks, elms, limes, and other trees, are a source of immense advantage: they are the resort of abundance of deer and of fur-bearing animals. The breeding of oxen, sheep, swine, and goats, is much attended to. The country-people have also great quantities of bees, and the fishing in the rivers is profitable. The minerals are copper and iron. The inhabitants build boats, and manufacture coarse woollens, linen, leather, brandy, and iron and wooden utensils. The principal commerce of the government is with Archangel, to which it exports corn, flax, linseed, honey, tallow, leather, furs, timber, iron, copper, and charcoal, and receives foreign wines and colonial produce.

Viatka, the capital of the government, is situated in 58° 22′ N. lat., 49° 45′ E. long., at the confluence of the Viatka and the Chlenopka. There are 23 churches, all of stone. The town, 9–10ths of which are built of wood, is the seat of government and the see of a bishop. There are a gymnasium, a seminary, and a convent. Some of the inhabitants are gold and silver smiths, but the greater part live by agriculture.

The second town in the government, *Sarapol*, on the Kama, nearly 400 miles S.W. of Viatka, is a well-built town, and has 6000 inhabitants. *Slobodskoi*, on the Viatka, has 6000 inhabitants, who manufacture iron and copper. *Votka* also has about 6000 inhabitants, who manufacture anchors and crucibles. At *Isch*, on the river Isch, 27 miles S.W. from Votka, there are large stone buildings, where fire-arms are manufactured for the army: the population is about 8000.

VIBORG. [Jutland.]

VIBRATION. [Undulatory Theory.]

VIBURNUM, a genus of plants belonging to the natural order *Caprifoliaceæ*. *V. tinus*, the Laurustinus, now so common throughout Europe, and the most general inhabitant of the gardens of Great Britain, is a native of the south of Europe and the north of Africa. It was introduced into England in 1596. Its ancient name was *Tinus*, and, from its resemblance to the laurel, *Laurus*, it was called *Laurustinus*. There are several varieties of this plant known in gardens.

All the varieties of Laurustinus are hardy shrubs, are evergreen, and bear the climate of Great Britain well: most of them blossom from November till April, and sometimes during May and June. *V. Lentago*, the Lentago, or Tree Viburnum, is a native of North America, and is found in hedges and on the borders of woods from New England to the Carolinas, and also in Canada. *V. Lantana*, the Wayfaring Tree, forms a shrub or low tree, and is a native of Europe and the west of Asia, in low woods and hedges, and chiefly on calcareous soils. In Great Britain it is not uncommon. When cultivated it forms a handsome shrub, rising from 18 to 20 feet in height, with large broad leaves, corymbs of white flowers, and heads of fruit first green, then red, and then black. *V. Opulus*, the Guelder Rose, or Snow-Ball, is a small tree, rising from 6 to 12 feet in height, with bright green leaves in summer, but in autumn assuming a beautiful pink or crimson hue. It is native throughout Europe, and is especially frequent in Britain and Sweden. In a wild state it is not remarkable for the beauty of its flowers, but its beautiful bunches of red berries render it a very attractive plant in the autumn of the year. The Guelder Rose seemed to have derived its name from growing in the Low Countries, in Guelderland, where it was first planted, and its flowers developed in all their beauty. *V. oxycoccos*, the Cranberry Guelder Rose, is a native of North America, on the mountains of New York and New Jersey, and throughout Canada to the arctic circle. It grows in swamps and shady woods, and attains a height of from 6 to 12 feet, and flowers in July. Only a few plants have been at present grown in Great Britain. It bears abundance of white flowers in July, which are followed by large bunches of red fruit in September.

VIC. [Meurthe.]

VIC-DESSOS. [Arie'ge.]

VIC-EN-BIGORRE. [Pyre'ne'es, Hautes.]

VIC-FEZENSAC. [Gers.]

VICAR, VICARAGE. [Benefice.]

VICAR-APOSTOLIC. [Roman Catholic Church.]

VICENTE, GIL. [Gil Vicente.]

VICE'NZA, a province of Austrian Italy forming part of the Venetian states, is bounded N. by the Tyrol, E. by the provinces of Belluno and Treviso, S. by the province of Padua, and W. by that of Verona. It is about 50 miles long from N. to S., and 25 miles in its greatest breadth. The area is 1083 square miles, and the population in 1842 was 332,288. The river Bacchiglione crosses the province of Vicenza in its length, and is joined by the Asdego and other affluents, which rise in the mountains on the borders of the Tyrol. The Brenta crosses the eastern part of the province, and passes by Bassano. More than half of the area of the province is occupied by mountains and hills; the rest, which is plain, is very fertile in corn, maize, pulse, potatoes, and hemp. The pastures are extensive. Fruit-trees are abundant, and the chestnut-trees in the mountains supply food to a part of the population. About 1100 cwts. of silk are made annually. The province of Vicenza has a large extent of forest. There are some coal-mines, not extensively worked. Horned cattle and sheep are numerous. The manufactures consist chiefly of woollens and silks. The principal towns are Vicenza and Bassano. *Cittadella* is an old fortified town, the fortifications of which are now in ruins. *Ricoaro*, in the mountains north of Vicenza, is celebrated for its mineral baths. *Montebello* is a large village on the road from Vicenza to Verona. *Asiago*, the head town of the Teutonic district of the Sette Comuni (Sieben Perghe), the inhabitants of which speak a very corrupt or very ancient dialect of German, is situated in the mountains north-west of Bassano; it has between 3000 and 4000 inhabitants, and a substantial church.

VICE'NZA (the ancient *Vicentia*), a city of Austrian Italy, capital of the province of Vicenza, is situated in a fertile country on the Bacchiglione, in 45° 32′ N. lat., 11° 33′ E. long., 40 miles W. from Venice by railway through Padua, and has 31,000 inhabitants. It is a walled town,

about three miles in circumference, and is very rich in palaces, many of which are works of Palladio; but the general appearance of the town does not correspond with the elegance of these mansions. The churches of Vicenza are rich in paintings by native artists. The Teatro Olimpico, which was not finished till after Palladio's death, is an imitation of an ancient theatre. Vicenza gives title to a bishop: it has a lyceum, a gymnasium, an ecclesiastical seminary, a college for boarders, and a public library with 36,000 volumes and about 200 MSS. There are also several private collections of minerals and fossils, with which the country abounds. The remains of antiquity consist of the ruins of a Roman theatre, some remains of a palace, and three arches of an aqueduct near the village of Olbia. Vicenza has been long known for its important silk manufactures. This city was taken by the Austrians, June 10, 1848, a garrison of Roman troops 15,000 strong having capitulated.

VICIA. [VICIEÆ.]

VI'CIEÆ, a tribe of plants belonging to the natural order *Leguminosæ*, and agreeing with the genus *Vicia* in their most prominent characters. The most important genera belonging to this tribe are *Vicia*, *Faba*, *Pisum*, *Ervum*, *Lathyrus*, *Orobus*, and *Cicer*.

The species of the genus *Vicia* are usually climbing herbs. Many of the species are much in use as green crops for feeding cattle, sheep, &c. *V. sativa*, Common Vetch, or Tare, is a native of Europe, and its extensive cultivation diffuses it more abundantly. [TARES.] It is also found in North America, about Fort Vancouver. *V. biennis*, Biennial Vetch, is a native of Siberia, and is very hardy, continuing green through the winter, and furnishing an early fodder. *V. Cracca*, Tufted Vetch, is a native of Europe, and is common in Great Britain in bushy places. The species of *Vicia* are easily cultivated, and will grow in any common soil.

The only species of the genus *Faba* is the *Faba vulgaris*, formerly *Vicia Faba*, the Garden-Bean and Horse-Bean. This plant, which is now so extensively cultivated for the sake of its seeds, for the food of both man and beast, is said to be found wild in Egypt.

The genus *Pisum* contains *P. sativum*, the Garden Pea, and *P. arvense*, the Gray Pea. [PEA.] *P. maritimum*, the Sea Pea, is a native of France, Denmark, and other parts of Europe, and also of Kamtchatka. In Great Britain it is found on the pebbly beach of Lincolnshire, Sussex, Kent, and Suffolk.

Most of the species of the genus *Ervum* are weeds, two of which, the *E. hirsutum* and *E. tetraspermum*, are found in Great Britain. *E. Lens* is the plant which produces the Lentil. It is a native of corn-fields on the Continent of Europe.

The species of the genus *Lathyrus* are above 60 in number. They are usually climbing herbs. *L. sativus*, Chickling Vetch, is a native of Spain, France, and Italy. *L. latifolius*, Broad-Leaved Everlasting Pea, is a native of Europe in woods; it is also found in Great Britain. It is one of the handsomest plants of the genus, and is a great favourite in our cottage gardens. *L. tuberosus*, Tuberous Everlasting Pea, is a native of Europe, but not wild in Great Britain. *L. odoratus*, the Sweet Pea, is a native of Sicily, and has long been a favourite in our gardens on account of its sweet-scented flowers. *L. tingitanus*, *L. articulatus*, and *L. annuus*, are frequently sown in gardens as border annuals: they form a variety, but have no scent in their flowers, nor are they so handsome as the Sweet Pea.

Of the genus *Orobus* the most valuable species are the following:—*O. tuberosus*, the Tuberous Bitter Vetch, is a native throughout Europe, and is abundant in Great Britain. *O. luteus*, Yellow Bitter Vetch, is a native of the Alps of Switzerland, France, Italy, and Siberia. It has handsome orange and yellow flowers. *O. niger*, Black Bitter Vetch, is a native of subalpine districts in Europe. It is found in Forfarshire and Inverness-shire in Scotland. The flowers are purple, and the plant turns quite black on drying. There are about forty other described species of *Orobus*. They are all elegant flowering plants, and being hardy, may be cultivated in the open flower-border.

For the genus *Cicer* see CICER.

VICH. [CATALUÑA.]

VICHY. [ALLIER.]

VICKSBURG. [MISSISSIPPI.]

VICO'A, a genus of plants of the natural family of *Compositæ* and subtribe *Inuleæ*. The species are natives of and found in most parts of the plains of India: some of them extend into the islands of the Indian Ocean.

VICQ-D'AZYR, FELIX, was born at Valogne in 1748. His father, who was a physician, sent him to study philosophy at Caen, and medicine at Paris. He received his licence to practise in 1773, and soon afterwards delivered lectures on comparative anatomy, which were well attended. He received considerable assistance in his further advancement through his marriage with a niece of Daubenton. In 1774 Vicq-d'Azyr was elected a member of the Academy of Sciences; and in 1775 he was sent to investigate a murrain which was raging among the cattle in the south of France. On his return he formed, with Lassonne, a scheme upon which the Royal Society of Medicine was founded in 1776, Vicq-d'Azyr being chosen perpetual secretary. In 1788 he succeeded Buffon in the French Academy. In 1789 he succeeded Lassonne as first physician to the queen. He died June 20, 1794.

Vicq-d'Azyr's works are very numerous, and were nearly all published together by Moreau de la Sarthe, Paris, 1805, 6 vols. 8vo., with a 4to. volume of plates.

VICTOR I., a native of Africa, succeeded Eleutherius as bishop of the Christian congregation at Rome, about A.D. 185. Victor had a warm controversy with the churches of Asia, and especially with Polycrates, bishop of Ephesus, concerning the proper time for celebrating the Easter festival. He died about A.D. 197.

VICTOR II., Gebhard, bishop of Eichstadt, was chosen to succeed Pope Leo IX., A.D. 1055. Having proceeded to Italy, he assembled a Council at Florence, in which several abuses in the disci-

pline of the clergy were condemned. During the same year a Council was held at Tours, to which Berenger was cited to defend his opinion against transubstantiation [BERENGER]; another Council was held at Lyon against simony, another at Rouen, to enforce continence among priests; and another at Narbonne, in which the usurpers of certain possessions of the Church were excommunicated. Pope Victor died at Florence in 1057.

VICTOR III., Desiderius, abbot of Monte Casino, was elected by the cardinals assembled at Salerno, after the death of Gregory VII., in 1085. Desiderius however declined the dignity, and the Church remained without a pontiff till Easter, 1086, when Desiderius was proclaimed. His short pontificate was a series of contests with the partisans of the anti-pope Guibert, who were in the majority at Rome. Victor, after endeavouring several times without success, to establish himself in the papal city, finally abandoned it, and withdrew to his favourite residence, Monte Casino, and thence to Beneventum, where he held a Council in the month of August, in which he anathematised the anti-pope Guibert, as well as Hugo, archbishop of Lyon, who had brought several unjust charges against him. But while the Council was sitting Pope Victor died, Sept. 16, 1087. He is better known in the history of learning as Desiderius, abbot of Monte Casino. In his convent he was a great collector of MSS., and employed amanuenses to copy the works of the classics.

VICTOR IV., Antipope. Octavian, Cardinal of St. Clement, was set up by a small faction of cardinals, supported by the Emperor Frederic I., in opposition to Pope Alexander III., A.D. 1159. This created a schism in the Church, which continued even after the death of the anti-pope Victor, which took place in 1164.

VICTORIA, *Colony of.* [WALES, NEW SOUTH.]

VICTORIA, *Town of.* [HONG KONG.]

VICTUALLERS, LICENSED. [ALEHOUSES.]

VICUÑA. [LLAMA.]

VIDA, MARCO GIRO'LAMO, born at Cremona about the year 1490, studied at Padua and Bologna, and distinguished himself in classical studies, and especially in Latin poetical composition. He entered the order of the regular canons of the Lateran. Leo X. happening to see his little Latin poem on chess, 'Scacchia Ludus,' and another entitled 'Bombyx,' or the Silkworm, urged him to undertake the composition of a more important and regular poem on the life of our Saviour, and in order to enable him to apply himself to his poetical studies, the Pope bestowed upon him the priory of San Silvestro at Frascati. Vida accordingly began his poem entitled 'Christiados,' of which he presented two cantos to Leo X., who praised them greatly, but the poem was not finished till many years after. Meantime he published, in 1527, his didactic poem 'De Arte Poeticâ,' which has been extolled by Scaliger, and other critics, as his best work. It has been translated into English.

In 1532 Clement VII. made Vida bishop of Alba in Piedmont and for thirty-four years he administered his see in a most meritorious manner. Vida died at Alba in 1566. He was one of the most learned scholars and most elegant Latin writers of the 16th century. His Latin poetry probably approaches nearer to the classical standard than that of any other modern writer.

VI'DUA, a genus of birds represented by the Whidah Birds, or Widow Birds (*Les Veuves* of the French), natives of Africa, and remarkable for the development of the caudal feathers in the male during the breeding season, when the plumage altogether assumes a new character. Examples, *Vidua Paradisea* and *Vidua erythrorhynchus*. Both species are not uncommon in the aviary of the Zoological Society and similar establishments. Habits and manners, those of the FRINGILLIDÆ generally. They are closely allied to the Buntings and Finches.

VIENNA (in German, *Wien*, *Vindobona* of the Romans), the metropolis of the Austrian Empire, is situated in 48° 10′ N. lat., and 16° 20′ E. long., on the right or south bank of an arm of the Danube, into which the little river Wien discharges itself on the east side of the old city. The population in 1850 was 383,095.

Vienna consists of the interior or old city, and the suburbs. The old city is nearly circular, and not above three miles in circumference. It is surrounded with a broad fosse, and a wall from forty to fifty feet high, which has ten regular bastions, and forms altogether what is called the Bastei, now one of the most favourite promenades of Vienna, commanding a very fine view. Beyond the fosse is the glacis, varying in breadth from 960 to 1500 feet, formerly reserved as a clear space without the walls, but now laid out in public walks. The city is surrounded by thirty-four suburbs, two of which are to the north-east, on the island of Leopoldstadt in the Danube, and the thirty-two others beyond the glacis. These thirty-two suburbs are surrounded by the lines, that is, a fosse with a wall twelve feet high. From the old city twelve gates lead to the suburbs, the principal of which is the Burg-Thor, or palace gate (the imperial palace being called the Burg), which was completed in 1824, and is a splendid piece of architecture, with five equal archways. From these gates there are paved streets and avenues to the principal streets in the suburbs, and these are connected by twelve other gates in the lines with the adjacent country. The extent of the lines is twelve miles.

The inner or old city, which occupies about a tenth part of the whole space, is very irregularly built; most of the streets are crooked and narrow; the Places (open places) are twenty in number, ten larger and ten smaller, but they are all small and irregular. Among the best are the New Parade, the Hof, the Hohe Markt, the Josephsplatz, and the Graben. The New Parade is nearly 1000 feet in length and 650 in breadth, perfectly regular, surrounded with avenues of trees, and adorned with grass-plots and flower-beds. The streets are in general well paved, cleansed, and lighted. The old city is the most fashionable: it contains the palaces of the emperor, of many of the principal nobility, the public offices, the finest churches, and most of the museums and public collections, the colleges, the exchange, and the most splendid shops. The houses, which are in general of brick,

are very high, of five or six stories, and some even more, and very large. Most of the houses are inhabited by several families, each occupying one floor, or part of one. There is a common staircase, and a porter keeps the street-door.

The public buildings, palaces, churches, &c., are very numerous. The most remarkable is the cathedral, dedicated to St. Stephen; it is a beautiful gothic structure, 342 feet in length, 222 feet in breadth between the two great towers. The highest of the four towers or steeples is 420 feet high. The interior of the structure is enriched with numerous beautiful altars and monuments. St Peter's, built on the model of St. Peter's at Rome, is adorned with fine frescoes and oil-paintings. The elegant church of the Augustines contains the celebrated mausoleum of the Archduchess Christina, a masterpiece of Canova, which cost 20,000 ducats. Many of the other churches are remarkable either for their beauty or their antiquity. The Burg, or imperial palace, is an old irregular edifice, built at different times, and consisting of three quadrangles; it contains the imperial jewel office, one of the richest collections of valuable curiosities in Europe, a fine cabinet of works of art, a very extensive collection of natural history, and the cabinet of medals, which far surpasses all other collections of the kind. The Imperial Library, connected with the Burg, is a handsome edifice, with a saloon, and a gallery 250 feet long, and in the centre 100 feet broad, in which is the imperial library, consisting of above 300,000 volumes and 16,000 manuscripts. The building formerly called the Imperial Chancery; the Imperial Riding-School; the splendid palace of the Archduke Charles, containing an extensive library and a collection of 180,000 engravings in 900 portfolios; the Mint; the University; The Town-House; the archbishop's Palace; the Imperial Arsenal; the City Hospital; the Town Arsenal; the Bank; the Chanceries; and the Custom House, are among the large public buildings of Vienna. The palaces of the nobility are numerous; and most of them contain good collections of paintings and other works of art. There are five or six theatres.

The hospitals and other charitable institutions are numerous and well endowed. The General Hospital, founded by Joseph II., is a very large building, containing 2000 beds; above 16,000 patients are annually received in it. The Lying-in Hospital, the Lunatic Asylum, the Deaf and Dumb Asylum, the Hospital of the Charitable Brothers, and the Invalid's House, are all large establishments.

The principal establishment for education is the University, founded by Duke Rudolph IV. in 1365. It has by degrees become the first medical school in Germany; it is attended by above 2000 students, and has 80 professors; it has a library of 100,000 volumes, an observatory, a botanic garden, an anatomical theatre, a veterinary school, a laboratory, and other appendages. The Josephinum, founded by Joseph II., is a medical institution for the instruction of surgeons for the army, with very rich collections. Other establishments worthy of notice are, the Imperial Oriental Academy; the Academy of Engineers; the Academy of the Fine Arts; the Normal School; the Polytechnic Institution; and many others.

Vienna being the centre of the Austrian dominions, is likewise the principal seat of commerce and manufactures. Its commerce is with Hungary, Turkey, Italy, and other countries. Since the establishment of the Danube Steam-Navigation Company, whose vessels go to Constantinople, Trebizond, and Smyrna, the trade with the Levant has greatly increased. Manufactures of every kind are carried on in Vienna, and employ above 80,000 workmen. The principal are, silk, velvet, shawls, gold and silver lace, cottons, woollens, ribbons, carpets, leather, porcelain, jewellery, mathematical and musical instruments, fire-arms, gold and silver plate, watches, fine cutlery, carriages, gloves, lace, straw-hats, paper, &c.

The suburbs, which are divided into eight police districts, are not wholly built on a regular plan, but they have broad and straight streets, many of which are of great length, and contain numerous palaces and gardens of the nobility, a great number of handsome private houses, 30 churches, and 9 convents.

The public promenades, which are the great places of resort for the citizens of Vienna, are—the Bastei, or ramparts of the old town; the glacis, or esplanade between the city and the suburbs; the Volksgarten (the people's garden); the private gardens of the palaces of Liechtenstein, Rasumowsky, Schwarzenberg, and the Belvedere; and the Prater, in the suburb Leopoldstadt, which is an immense park. The Prater is a league and a half in length, and is traversed by six noble avenues of chestnut-trees, running in different directions, the principal one being 15,000 feet in length. It is divided into three parts; one for horsemen, one for pedestrians, and the broad road between them for carriages; and is by far the gayest place in Vienna. Near the Prater is another open spot of a humbler description, called the Würstel Prater, covered with innumerable liquor-shops, Russian swings, roundabouts, jugglers, and all sorts of diversions for the lower classes, who, on Sundays and holidays in the afternoon, repair thither in throngs. Adjoining the Prater is the Augarten, and next to that the Brigittenau, which are very agreeable walks, but not so frequented as the Prater.

Great lines of railway extend from Vienna N.N.E. to Warsaw; N.W. through Prague, Dresden, and Berlin, to Hamburg; E., through Pesth, to Debreczin; and S.S.W. (nearly completed) to Trieste.

VIENNE, a department in France, formed out of part of the old province of Poitou, is bounded N. by Maine-et-Loire and Indre-et-Loire, E. by Indre, S. by Haute-Vienne and Charente, and W. by Deux-Sèvres. Its greatest length is 80 miles; its greatest breadth, 51 miles. The area is 2608.6 square miles, and the population in 1846 was 308,391, giving 118.22 to the square mile, which is 55.53 below the average per square mile for the whole of France.

The department has no mountains; the Gâtine Hills, which extend from the mountains of Auvergne toward the mouth of the Loire, cross

the south-west of the department; and a branch from these hills extends towards the north-east, between the Clain and the Thoué, subsiding however into the valley of the Loire before reaching the northern boundary. The central part, between the Clain and the Vienne, consists of tolerably high ground; but the part E. of the Vienne is low.

The department belongs to the basin of the Loire, except the south-west corner, about Civray, which is drained by the Charente. The *Vienne*, which is one of the principal affluents of the Loire, rises in Corrèze; after crossing the department of Haute-Vienne, and a part of Charente, it enters this department on the south, just above Availles, and flows northwards through the department, which it quits below the junction of the Creuse. It is navigable for about 40 miles from its junction with the Clain to its entrance into the Loire in Indre-et-Loire. Nearly all the other rivers of the department are tributaries of the Vienne; none of these are navigable except the Creuse. The *Clain* rises in the department of Charente, but has nearly the whole of its course of more than 60 miles in this department. The *Dive*, a tributary of the Thoué, a feeder of the Loire, rises in this department, and has the greater part of its course on the western border. The Charente just crosses the south-western angle of the department. The department is traversed by 6 national and 9 departmental roads; and by the Orléans-Bordeaux Railway.

The area of the department is 1,670,493 acres, of which more than 1,000,000 acres are under the plough. The most productive soils are in the north of the department; those of the south and south-east are generally poor. The principal productions are wheat, maize, millet, rye, oats, hemp, flax, peas, and potatoes. A great number of horses, mules, horned cattle, sheep, goats, and pigs, are bred; poultry is abundant. The vineyards occupy 70,000 acres, and yield ordinary white and red wine. The woods cover above 200,000 acres; waste and barren lands nearly as much. A considerable quantity of walnuts, chestnuts, and fruit, are grown.

There are three establishments for the manufacture of iron. There are several quarries for millstones, whetstones, lithographic-stone, limestone, and freestone; and a quarry of marble which takes a good polish. There are sulphureous mineral waters at La Roche-Posay. The manufactures include coarse woollens, serge, lace, hosiery, cutlery, bleached linen, leather, and paper.

The department is divided into 5 arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Poitiers . .	10	82	106,271
Châtellerault	6	50	57,350
Civray . .	5	45	49,382
Loudun . .	4	63	35,710
Montmorillon	6	60	59,678
Total . .	31	300	308,391

Of the arrondissement of Poitiers, and of the whole department, the capital is Poitiers. *Lusignan*, 17 miles from Poitiers, on the road to Rochefort, formerly famous for one of the strongest feudal castles in France, very little of which now remains, has tan-yards; an important trade in corn, seeds, and mules; and a population of 2393. *Mirebeau*, 16 miles N. by W. from Poitiers, also once famous for its castle built by Foulques Néra, in which Eleanor, widow of the English Henry II., was besieged in 1202, has 2556 inhabitants, who trade in agricultural produce. *Neuville*, 8 miles N.W. from Poitiers, has a population of 2755. *Vivonne*, 12 miles by railway S. from Poitiers, has a corn-market, manufactures of coarse woollens, and a population of 2661. *Vouillé*, a small village, 10 miles W. from Poitiers, on a feeder of the Clain, has given name to the great defeat of the Visigoths by the Franks under Clovis, in 507.

The arrondissement of Châtellerault is named from its chief town *Châtellerault*, which stands on the right bank of the Vienne, 20 miles N.E. by railway from Poitiers, and has tribunals of first instance and of commerce, a college, and 9904 inhabitants, who manufacture cutlery, jewellery, hardware, lace, side-arms, &c. The old fortifications of the town are now replaced by handsome residences and pretty promenades. A fine stone bridge joins the town to suburbs on the left bank of the Vienne. A large mansion, flanked by four massive towers, stands at one end of the bridge, and forms a gate-entrance to the town, the high road passing under a lofty arch in the centre of the building. The town is in general ill built; the most remarkable structures are the gothic church of St.-Jean, the tower of the church of Notre-Dame, the theatre, and the national factory of side-arms. Châtellerault has some important iron-works.

Of the arrondissement of Civray, the chief town is *Civray*, which is situated in a fertile territory, 30 miles S. from Poitiers, on the right bank of the Charente, and has a parish church of great antiquity, a tribunal of first instance, a college, and 2147 inhabitants, who manufacture woollen stuffs, and trade in corn, truffles, chestnuts, seeds, and cattle. *Availles*, E. of Civray, on the left bank of the Vienne, has mineral springs, and 2000 inhabitants.

The chief town of the arrondissement of Loudun is *Loudun*, which stands on the slope of a hill, above an extensive plain, 34 miles N. by W. from Poitiers, and has a tribunal of first instance, a college, and 5028 inhabitants. It is a large town for the population, with wide streets and spacious houses. On the site of the ancient castle, of which only a single tower remains, a handsome promenade has been formed. Woollen cloth, linen, lace, jewellery, and leather, are the chief industrial products; there is also a good trade in corn, seeds, white wine, oil, hides, dried fruits, flax, hemp, &c.

The arrondissement of Montmorillon is named from its chief town *Montmorillon*, which is built in a pretty situation on the Gartempe, a feeder of the Creuse, 27 miles S.W. from Poitiers, and has

a tribunal of first instance, a secondary ecclesiastical school, linen bleach-mills, and 4961 inhabitants, who manufacture biscuits, maccaroni, and paper. This town was formerly defended by walls and a castle, which were demolished by the Prince of Conti, who took the place for Henri IV., June 6, 1491. The famous hospital of Maison-Dieu, founded towards the end of the 11th century, by Robert du Pui, for the benefit of the sick and the poor, was very richly endowed; it was managed by Augustinian monks from 1613 till the first Revolution, when the property of the hospital was seized, and the buildings sold. The buildings, which are spacious, of very curious construction, and contain several groups of strange unexplained allegorical figures, were purchased by the diocesan board for the purposes of a theological seminary.

The department forms, with that of Deux-Sèvres, the see of the bishop of Poitiers; it is included in the jurisdiction of the High Court and University-Academy of Poitiers; and forms a subdivision of the 14th Military Division, of which Nantes is head-quarters. Under the late monarchy it returned 5 members to the Chamber of Deputies; it now has 6 representatives in the Legislative Assembly of the Republic.

(*Dictionnaire de la France; Annuaire pour l'An* 1851; *Annuaire du Commerce pour* 1850.)

VIENNE, HAUTE, a department in France, formed out of upper Limousin, part of lower Marche, and a few districts of upper Poitou, is bounded N. by the departments of Vienne and Indre, E. by that of Creuse, S. by those of Corrèze and Dordogne, and W. by Charente. Its greatest length is 60 miles, and its greatest breadth 50. The area is 2140 square miles, and the population is 314,739, which gives 147.07 to the square mile, being 26.68 below the average per square mile for the whole of France.

The heights of Gâtine, which extend from the great central mountain-group of Auvergne toward the mouth of the Loire, and separate the basin of that river from those of the Garonne and the Charente, cross the southern part of this department in a direction nearly from east to west. Mount Jargeau, the most elevated point on this chain of hills, is about 3114 feet high. Another chain, nearly parallel to these, crosses the centre of the department, separating the valley of the Vienne from that of the Gartempe. The most elevated point in this chain is Le Puy le Vieux, 3196 feet high. The mountains have generally round tops; few steep or craggy summits appear. There are in the department, 25 iron-works, with 9 furnaces for producing pig-iron, and 48 forges, of which 39 produce wrought-iron and 9 steel. Iron, copper, lead, antimony, and coal mines, are worked. Porcelain-clay and granular felspar are obtained. Good granite and other building-stone and limestone are dug. Coarse cloth, druggets, flannel, blankets, linen, cotton-yarn, leather, paper, nails, glass, porcelain, and pottery, are the chief industrial products, besides iron, which is the most important.

The department is chiefly included in the basin of the Loire: the southern slopes of the Gâtine heights belong to the basins of the Charente and the Garonne. Of the tributaries of the Loire, the Vienne crosses this department from E. to W. into the department of Charente, after receiving several small feeders on both banks. The Gartempe, a feeder of the Creuse, drains the northern part. None of the rivers of the department are navigable. Ponds are numerous, but small. The department is traversed by 7 national, 9 departmental, and 34 parish roads, with a total aggregate length of 4600 miles.

The climate is colder than the latitude would lead one to expect. The average temperature of Limoges is lower than that of Paris. The atmosphere is moist and the temperature changeable.

The area of the department is 1,369,670 acres, of which about 533,000 acres are under the plough; but of this only a small portion is fit to grow wheat. A considerable quantity of rye and buck-wheat is grown; the growth of corn is however insufficient for the support of the inhabitants: the deficiency is made up by the abundance of chestnuts. The meadow and pasture lands amount to above 320,000 acres, besides 230,000 acres of heath or other open pasture; and grazing forms the most important branch of agricultural industry. The hay is excellent, but the artificial grasses are scarcely known. A great number of mules, of horses of the esteemed Limousin breed, and of horned cattle, are reared. Horse-races and a cattle-show are held yearly at Limoges, and prizes distributed. Pigs are numerous. The vineyards occupy only about 7000 acres, and produce only ordinary red wine. About 90,000 acres are occupied with woods, chiefly in small clumps or in copses; chestnuts and walnuts are grown in great abundance, and there is a considerable quantity of oak timber. Game is plentiful. A great number of bees are kept.

The department is divided into 4 arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1847.
Limoges . .	10	78	134,176
St.-Yrieux .	4	26	44,732
Bellac . . .	8	65	84,295
Rochechouart	5	30	51,536
Total . .	27	199	314,739

Of the arrondissement of Limoges and of the whole department, the capital is Limoges. *Aixe*, a small town of 2631 inhabitants, 7 miles S.W. from Limoges, on the Vienne, was formerly famous for its feudal castle, which has long totally disappeared, and part of the site of which is now under tillage. *Ambazac*, 10 miles N.N.W. from Limoges, has a wire factory and 2812 inhabitants. *Eymoutiers*, 26 miles E. by S. from Limoges, in a wild picturesque valley on the Vienne, has a population of 3491, including the whole commune. *St. Léonard*, an ancient town of 5680 inhabitants, is situated 11 miles E. from Limoges on the right bank of the Vienne, which is here crossed by a handsome bridge. The town stands on a slight

eminence above the river; it is surrounded by boulevards, which occupy the site of the old fortifications and are shaded by fine trees. The town church, which was founded in 1062 and repaired in 1484, is the most remarkable building. Coarse woollens, blankets, porcelain, woollen-yarn, copperware, leather, and paper, are the chief industrial products.

The arrondissement of St.-Yrieux is named from its chief town *St.-Yrieux*, which stands 23 miles S. from Limoges, on the left bank of the Loue, a feeder of the Isle, one of the tributaries of the Dordogne, and has a tribunal of first instance, a college, and 7110 inhabitants. The town is ill built, but contains a remarkable church of the 13th century, and near it a high battlemented tower of the 11th century, which was built to command the abbey of *St.-Yrieux*, to which the church belonged. Porcelain, linen, pottery, hides, hemp, and cattle, enter into the trade of the town. *Chalus*, 15 miles N.W. from St.-Yrieux, near the source of the Tardoire, has 2052 inhabitants. *St.-Germain-les-Belles*, 18 miles N.E. from St.-Yrieux, has a population of 2401.

In the arrondissement of Bellac the chief town is *Bellac*, which stands on the slope of a steep hill above the Vinçon, a feeder of the Gartempe, 24 miles N. by W. from Limoges, and has a tribunal of first instance, manufactures of linen, paper, woollen-cloth, blankets, hats, and leather, and a population of 3583. Not far from the town there is a druidical monument consisting of five immense stone blocks covered over with an enormous slab. The courthouse and guard-house of Bellac are formed out of a portion of the old castle built by Boson le Vieux in the 10th century. *Bessines*, on the left bank of the Gartempe, population, 2640; *Châteaux Ponsat*, 12 miles from Bellac, also on the left bank of the Gartempe, population 3837; *Le-Dorat*, 6 miles N. from Bellac, prettily situated on the Sèvre, a feeder of the Gartempe, with a spacious church of the 10th century, a clerical seminary and 2439 inhabitants; and *Magnac-Laval*, 5 miles E. of Le-Dorat, with a population of 3567, give names to cantons.

The arrondissement of Rochechouart is named from its chief town *Rochechouart*, which is situated on the slope and at the foot of a rocky hill, above the Grenne, a small feeder of the Vienne, 22 miles W. from Limoges, and has a tribunal of first instance and 4185 inhabitants, who manufacture vinegar, glass bottles, tiles, and bricks. The summit of the rock was covered with a strong old castle now partly in ruins; it is surrounded by walls flanked with towers, the largest of which now serves for a prison. There are iron-works in the neighbourhood of this town. *St.-Junien* is built on the slope of a hill which stands in the fork between the Vienne and its feeder the Glane, 7 miles N.E. from Rochechouart, and has 5467 inhabitants. The town is surrounded by boulevards planted with fine trees and affording a rich and varied prospect. The parish church, classed among French historical monuments, and dating from the 13th century; and the chapel of Notre-Dame, situated close to the bridge over the Vienne, are the most note-worthy structures in the town. The inhabitants of St.-Junien manufacture serge, cotton and woollen stuffs, leather-gloves, pottery, porcelain, paper, leather, &c. *Oradour-sur-Vayres*, a large village situated 6 miles S. from Rochechouart, at the foot of a hill which separates it from the right bank of the Tardoire, has 3128 inhabitants.

The department forms, together with that of Creuse, the see of the bishop of Limoges; it is included in the jurisdiction of the High Court and University-Academy of Limoges; and forms a subdivision of the 13th Military Division, of which Clermont-Ferrand is head-quarters. Under the late monarchy it returned 5 members to the Chamber of Deputies; it now has 7 representatives in the Legislative Assembly of the Republic.

(*Dictionnaire de la France; Annuaire pour l'An* 1851; *Annuaire du Commerce pour* 1850.)

VIENNE. [ISE'RE.]

VIERZON. [CHER.]

VIETA, FRANCIS, was born near La Rochelle in 1640, passed his life in high public situations, and died in 1603. He is the improver of algebra by the systematic introduction of symbols to stand for quantities, both known and unknown: and in one sense he is, what he has been called, the inventor of algebra; that is to say, he is the first who altered the form of the science which, under that name, was received from the Mohammedans, who themselves obtained it from India. But no short account can be given of his writings, and we therefore refer the reader to the 'Penny Cyclopædia.' His collected works were published in 1640, and they are not very scarce.

VIGA GANITA and LILIWATI. The names of two Hindoo works, the first on Algebra, the second on Arithmetic, written by Bhascara Acharya, in the 12th century. They are our principal sources of information on Hindoo mathematics, and a full account of them is given in the 'Penny Cyclopædia.'

VIGAN, LE. [GARD.]

VIGEVANO. [NOVARA.]

VIGI'LIUS, a deacon of the church of Rome, happened to be at Constantinople when Theodora, wife of the Emperor Justinian, determined to depose Pope Sylverius, on a charge of having corresponded with the Goths, who were besieging Rome, A.D. 537. Vigilius was elected by the clergy of Rome in November, 537, and he soon after repaired to Rome, where he was installed in his see through the influence of Belisarius. In the year 538 Sylverius died. From that time Vigilius showed himself less docile to the caprices of the court of Constantinople; he maintained the authority of the Council of Chalcedon, and he even incurred the displeasure of Justinian because he would not subscribe to the theological opinions of that emperor.

In the year 547 Vigilius repaired to Constantinople at the request of Justinian, who was warmly engaged in a theological controversy, which is known in church history by the name of the 'Three Chapters.' Vigilius, after remaining at Constantinople for some years, was obliged to escape from the wrath of the Emperor, whose opinion he opposed, to Chalcedon, where he took

refuge in a sanctuary in 552. In the following year Justinian convoked a general council at Constantinople, chiefly to decide upon the question of the 'Three Chapters,' or, in other words, to condemn certain controversial writings of three bishops of the preceding century, Theodore of Mopsuestia, Ibas of Edessa, and Theodoretus. Vigilius refused to condemn those writings, and for this he was banished, with other bishops of his own opinion, to the island of Proconnesus. Meantime the Council of Constantinople had condemned the 'Three Chapters,' and its decision was now sanctioned by Vigilius, after which Justinian permitted him to return to Italy. On his way to Rome by sea, Vigilius landed at Syracuse, where he died, in his 70th year. He was succeeded by Pelagius I.

VIGNO'LA, GIA'COMO BAROZZI, was born in 1507, at Vignola, in the territory of Modena, whence he derives his name. He studied painting at Bologna, but abandoned it for architecture, a study he had been led to by that of perspective, in which he had discovered some new principles and practical rules. He now set out for Rome, and about 1537 accompanied Primaticcio to France, where he made several models and designs for Francis I. On returning to Italy he fixed himself for awhile at Bologna, where he was employed upon various works. He next went to Piacenza, where he designed the ducal palace. It was perhaps about this period that he erected the church at Mazzano, the Madonna degli Angeli at Assisi, the chapel of San Francesco at Perugia, and other structures in various parts of Italy. Having been appointed architect to Pope Julius III., he was entrusted with the direction of the Trevi aqueduct, and employed almost immediately on the villa for himself, called 'La Papa Giulio,' or 'Villa Giulia.' After the death of Julius Vignola found a patron in his nephew the Cardinal Alexander Farnese, for whom he erected his chef-d'œuvre, the celebrated palace at Caprarola. He had also the superintendence of the works at St. Peter's on the death of Michel Angelo (1564). He died at Rome, July 7, 1573. What has mainly tended to confer on Vignola the celebrity he enjoys throughout Europe is his 'Treatise on the Five Orders,' which however has done injury to art by inducing artists to restrain themselves to fixed rules. Of Vignola's own designs, &c., the best collection is that in large folio, Paris, 1823.

VIGO. [Galicia.]

VIGORS, NICHOLAS AYLWARD, was born in 1787, at Old Leighlin, in the county of Carlow. He became a student at Trinity College, Oxford. In 1809 he had an ensigncy purchased for him in the Grenadier Guards, and was present at the action of Barrosa, in 1811, where he was severely wounded. On his return to England he quitted the army, and devoted himself to the study of zoology, especially of birds and insects. In both these subjects he acquired great knowledge, and formed extensive collections, which he at a subsequent period presented to the museum of the Zoological Society. On the death of his father he succeeded to the family estate, and in 1832 became the representative in parliament of the borough of Carlow, for which and for the county of Carlow he continued to sit until his death, Oct. 26, 1840.

Mr. Vigors contributed a large number of valuable papers to the 'Transactions' of the Linnæan Society and of the Zoological Society, and the pages of the 'Zoological Journal.' He was one of the founders of the Zoological Club of the Linnæan Society, from which sprung the Zoological Society, of which society he was the first secretary, and through the whole of his life he devoted much of his time and talents to its interests.

VIKKUR. [Sinde.]

VILAINE. [Ille-et-Vilaine.]

VILL. [Town.]

VILLA-FRANCA. [Nice.]

VILLA-REAL. [Algarve.]

VILLACH. [Illyria.]

VILLACAÑAS. [Castilla-la-Nueva.]

VILLA'NI, GIOVANNI, born at Florence in the latter part of the 13th century, was a merchant, and travelled in various countries in the pursuit of business. He filled several offices in the service of the republic of Florence, and afterwards served in the Florentine army in the war against Castruccio Castracani, after whose death, in 1328, he negociated the peace with Lucca. He was involved in the bankruptcy of the mercantile company of the Bardi in 1345, and was imprisoned in consequence of it as an insolvent. He died in 1348. Villani wrote the history of his country, in twelve books, from the building of Florence till the time of Villani's death. The work appears to have lain forgotten for nearly two centuries, until 1537, when the first ten books were published at Venice in that year, the eleventh and twelfth books being published at Florence in 1554.

Matteo Villani, brother of Giovanni, wrote, after his brother's death, a continuation of his history, and brought it down to the year 1563, in which he died.

Lastly, Filippo Villani, Matteo's son, added a continuation to his father's narrative. The whole body of history by the three Villani was published together by Muratori, and has been reprinted several times since.

VILLANUEVA. [Cataluña.]

VILLARS, LOUIS HECTOR, was born at Moulins in 1653. He studied at the college of Juilly, and was, on quitting that seminary, enrolled among the 'pages de la grande écurie.' He afterwards served in Holland as a volunteer in the corps commanded by Louis XIV. His courage and activity, and perhaps his fine figure, obtained for him a troop of horse at the age of nineteen.

The next two years he served in Germany under Turenne. The mingled good sense and gallantry which he showed at the battle of Sénef procured for him a regiment of cavalry in 1674. From 1674 till the peace of Nimwegen in 1678 Villars served in Flanders under the Maréchal de Luxembourg, and in Alsatia under the Maréchal de Crequi. The next ten years of his life were spent principally in diplomatic employments. Soon after the peace of 1678 he was sent to Vienna to condole with Leopold I. on the death

of the Empress-mother. At Vienna he succeeded in detaching the Elector of Bavaria from the Austrian interest, and Villars accompanied him on his return to Munich, and followed him into Hungary, when he assumed the command of the Bavarian contingent in the imperial army levied against the Turks. On his return to Munich he found he had lost his influence with the Elector, and was obliged to leave the court. He did not however lose his favour with Louis, and in 1688, on the eve of the war occasioned by the league of Augsburg, he was appointed commissary-general of the cavalry.

After an unsuccessful attempt to regain his old ascendancy over the Elector of Bavaria, Villars was next appointed to command the cavalry of the Maréchal d'Humières, whose army was stationed in Flanders. In 1689 he was created maréchal-de-camp. During the following two years he commanded a body of 15,000 men, which formed a reserve to the army of the Maréchal de Luxembourg. He was subsequently sent to the Rhine to assist with his counsels the Maréchal de Joyeuse, who was hard pressed by the Prince of Baden. In this service he continued till the peace of Ryswick in 1697.

The intrigues which preceded the Spanish War of Succession were now in full vigour. In 1699 Villars was entrusted with the delicate mission of ambassador-extraordinary to Vienna. He spent three years at that court, during which he rendered most essential services to his master.

On the commencement of hostilities in 1701 Villars was for a short time with the army commanded by Villeroi in Italy. He was next with Catinat when he was appointed to the army of Germany. The events of his campaign in Germany in 1703, when he was sent at the head of a large force to disengage the Elector of Bavaria, who was surrounded by Austrian troops, are faithfully portrayed in his correspondence with the Elector, Louis XIV., and his minister-at-war, and the letters of the general officers under his command, published at Amsterdam in 1762. The French general was everywhere successful, but the imbecility of the Elector of Bavaria neutralised all his victories. Disgusted with his position, Villars obtained his recall. The next charge with which he was entrusted was to terminate the war of the Cevennes. This he accomplished in a manner at once most creditable to his courage and humanity, and peace was restored to the province, notwithstanding the intrigues of foreign emissaries, and the insincerity of the French court itself.

From 1705 till 1714 the life of Villars was a succession of campaigns. Sent by the King in the former year to inspect and strengthen the defences of the eastern frontier, his masterly encampment at Fronsberg caused Marlborough to retire with his 110,000 men; and this was no sooner done than Villars, resuming the offensive, burst into Alsatia, forced the lines of Weissenburg, presented himself before Lauterburg, crossed the Rhine between Fort Louis and Strasbourg, and laying the whole country between the river and the Schwarzwald under contribution, closed the campaign of 1705. In 1706 he took Lauterburg and Hagenau. This success was neutralised by Villars's loss of the battle of Ramillies in Flanders, and the minister Chamillard's withdrawing some of his best troops. In 1707 Villars crossed the Rhine; forced the lines of Stollhofen, May 23; established his head-quarters at Rastadt on the evening of the same day, and the next occupied Stutgard. Troops were again withdrawn from him, and he was obliged to re-cross the Rhine. In 1708 he was sent to command on the frontier of Savoy, but the campaign terminated without effect. In 1709 he was sent to re-organise the dispirited and demoralised army of Flanders. At the battle of Malplaquet he was wounded early in the day, and was compelled to remain inactive the rest of the year. The campaign of 1710 was desultory. In the autumn Villars's wound broke open, and he was obliged to resign for a time the command of the army. In 1711 the exhausted state of French finances kept Villars on the defensive within the frontier. In 1712 the battle of Denain, the capture of Marchiennes, Douai, and a number of forts, by Villars, restored courage to the French. The peace of Utrecht was concluded (separately) by Holland and England in 1713. Austria refused to sign the treaty; Villars was sent into Germany at the head of an army, and on the 7th of March, 1714, the peace of Rastadt was concluded.

From 1714 to 1732 Villars was exclusively engaged in the turmoil of state intrigue, caused by the death of Louis XIV., and the enmity of the Abbés Dubois and Fleury towards him. Villars however retained at any rate the outward respect of the regent, and was further protected by the affection of the young king, and the favour of the Duke of Bourbon. This continued till 1732, when the rupture with Austria on account of the Spanish possessions in Italy rendered the military services of Villars indispensable. In his 81st year he was sent to command in Italy with the rank of maréchal-général de la France, which had never been conferred on any one before him, except Turenne. In the campaigns of 1733 and 1734 he evinced all the ardour, activity, and contempt of danger which characterised his youth. He was taken ill at Turin on his way to France, and died June 17, 1734.

VILLA'RSIA, a genus of plants belonging to the natural order of *Gentianaceæ*. *V. Nymphæoïdes*, Nymphæa, is a floating plant, a native of Denmark, Holland, Sweden, Germany, Piedmont, and of Siberia. It is found in ditches and slow-running streams. It is also a native of Great Britain, though comparatively rare. It is a beautiful plant, and may be easily cultivated. *V. ovata*, Ovate-Leaved Villarsia, is an erect plant, growing in wet boggy places at the Cape of Good Hope. All the species of *Villarsia* are elegant plants when in blossom, and deserve a place in the garden and greenhouse.

VILLE-EN-AUX. [AUBE.]

VILLEFRANCHE. [AVEYRON; GARONNE, HAUTE; RHÔNE.]

VILLEIN, or VILLAIN, denotes a species of bondman subject to his feudal superior. The word is from the low Latin form *Villánus*, which

is from the Latin word *Villa*. In England, during the Anglo-Saxon period, a large part of the people appear to have been in a servile condition, either as domestic slaves or cultivators of the land. The Norman conquest did not materially alter the state of slavery in England. The lands were transferred to Norman masters, and the slaves passed as part of the property.

The legal condition of villeins in the reign of Edward IV., when Littleton wrote his book of Tenures, appears from that work, sections 172–208.

In England a few instances of prædial servitude existed till the reign of Elizabeth, and perhaps still later. In some parts of France it existed down to the revolution of 1798.

VILLEINAGE was a base tenure of land. This tenure was founded on the servile state of the occupiers of the soil [VILLEIN], who were allowed to hold portions of land at the will of their lord, on condition of performing base and menial services. Where the service was base in its nature, and uncertain as to time and quantity, the tenure was called pure villeinage; but where the service, though base, was certain and defined, it was termed privileged villeinage, and sometimes villein-socage. [COPYHOLD.]

VILLEMUR-SUR-TARN. [GARONNE, HAUTE.]

VILLENEUVE. [GARD; YONNE.]

VILLERS-COTERÊTS. [AISNE.]

VILLETTE, LA. [SEINE.]

VILLIERS. [BUCKINGHAM, DUKE OF.]

VILLOISON, JEAN BAPTISTE GASPARD D'ANSSE DE, was born at Corbeil-sur-Seine on the 5th of March, 1750. At a very early age he acquired a great reputation for his knowledge of Greek. He was scarcely twenty-two when he published from a MS. at St. Germain the first edition of Apollonius's Lexicon on the 'Iliad' and 'Odyssey,' together with the fragments of Philémon, Paris, 1773, 2 vols. fol. In 1778 he was sent at the expense of the French government to Venice, to search the library of St. Mark. He discovered here a MS. of Homer's 'Iliad,' which probably belonged to the 10th century, and contained the valuable Scholia, now known as the Venetian Scholia. This MS., with learned prolegomena by Villoison, was published at Venice, 1788, folio. In 1785 he accompanied the French ambassador, Count Choiseul Gouffier, to Constantinople, and he travelled for three years in the islands of the Archipelago and on the continent of Greece, during which time he made himself perfect master of the modern Greek language. He also collected materials for a description of ancient and modern Greece. On his return the Revolution had broken out, and he retired to Orléans to labour at his work on Greece. Napoleon appointed him professor of ancient and modern Greek in the Collège de France, but he had scarcely entered upon this office when he was seized by an illness which terminated in his death on the 26th of April, 1805. The 'Memoirs' of the Academy of Inscriptions contain several valuable papers by Villoison. The materials for his great work on Greece, in 15 large quarto volumes, as well as his remarks on Tournefort and on Montfaucon's 'Palæographica Græca,' of which he likewise intended to publish a new edition, are in MS. in the royal library of Paris.

VILNA. [WILNA.]

VIMOUTIER. [ORNE.]

VINCA (from *vinco*, to bind), a genus of plants belonging to the natural order *Apocynaceæ*. Five or six species of this genus have been described: they are creeping, suffruticose, or herbaceous plants, with smooth, shining, opposite leaves, with blue, purple, or white flowers, seated on solitary, axillary, alternate peduncles. They are all natives of Europe, in shady places.

V. major, the Greater Periwinkle, is a native of the middle and southern parts of Europe, and is apparently wild in many parts of Great Britain, but it may be doubted whether it is an original native of this island. Its flowers are of a fine purple-blue colour, and are larger than those of any other species. The flowers appear early in spring, and continue open all the summer. It is well adapted for growing on the ground of shrubberies, as well as on the banks of hedgerows, or in any shady place. *V. minor*, the Lesser Periwinkle, is also a native of Europe, in the same situations as the last, and is often found in Great Britain. It varies much in the colour of its flowers, which are sometimes double. *V. herbacea*, Herbaceous Periwinkle, has flowers of a pale blue colour. It is an elegant plant, and is a native of Hungary. *V. rosea* is an East Indian Periwinkle. It has an erect stem with twin sessile flowers. Like all the species, it may be easily propagated by cuttings or dividing the roots. It is continually in flower. It has pale flowers, and two or three varieties are known in gardens.

All the species are easily cultivated, and are very desirable plants for gardens, as they retain their leaves all the year round.

VINCE, SAMUEL, a distinguished mathematician, and Plumian Professor of Astronomy and Experimental Philosophy in the university of Cambridge. He took orders, and was promoted to the archdeaconry of Bedford. He died in December, 1821.

Professor Vince was elected a Fellow of the Royal Society in 1786, having previously written a paper on friction, which was published in the 'Philosophical Transactions' for 1785. There is also, in the volume for 1795, a paper by Vince, entitled 'Observations on the Theory of the Motion and Resistance of Fluids,' and, in the volume for 1798, one entitled 'Experiments on the Resistance of Bodies moving in Fluids.'

In conjunction with the Rev. James Wood, Professor Vince published at Cambridge a 'Course of Mathematics and Natural Philosophy, for the Use of Students in the University;' and of this valuable work there have since been several editions with considerable improvements: the parts written by Vince are entitled 'Elements of Conic Sections, intended as Preparations for the reading of Newton's Principia;' 'Principles of Fluxions;' 'Principles of Hydrostatics;' and 'Elements of Astronomy.' In 1790 came out his 'Treatise of Practical Astronomy,' in 4to., containing descrip-

tions of the construction and the uses of astronomical instruments; but his principal work is a 'Complete System of Astronomy,' which was published at Cambridge in 3 vols. 4to. (1797 to 1808).

VINCENNES. [SEINE.]

VINCENT, ST., one of the islands of the Columbian Archipelago, situated between 13° 10′ and 13° 25′ N. lat., and 61° 10′ and 61° 20′ W. long., having Barbadoes on the E., Grenada on the S., and St. Lucia on the N. It is one of the most beautiful islands of the Caribbee group, of an oval form, 18 miles long by 11 broad. The Grenadines consist of several small islets off the southern extremity of the coast. The most remarkable physical feature of St. Vincent is the Souffrière, a volcanic mountain 3000 feet high, with a crater half a mile in diameter, from the centre of which rises a conical hill 300 feet high, and 200 feet in diameter at the base. After a repose of nearly a century an eruption of the mountain took place in 1812. St. Vincent has several times suffered severely from hurricanes, but it is one of the healthiest islands of the archipelago.

St. Vincent was discovered by Columbus in 1498, at which time the natives were numerous, and continued to be so for a long period afterwards. In 1672 Charles II. placed St. Vincent with Barbadoes and some other islands under one government. The possession of the island was afterwards a matter of dispute with the French, but it was at length yielded to the British by the peace of 1783.

St. Vincent is a dependency of the government of Barbadoes, under a lieutenant-governor, who is assisted by a council of twelve members, and a House of Assembly.

The imports in 1848 amounted to 139,249*l.*, the exports to 205,719*l.* The British produce and manufactures exported to St. Vincent in 1849 amounted in value to 58,268*l.*

The population of St. Vincent is about 30,000, of whom about 1000 are whites. *Kingston*, the capital of the island, has a population of about 3000.

VINCENT, EARL OF ST. [JERVIS.]

VINCENT, WILLIAM, was born Nov. 2, 1739, in the city of London, where his father carried on business, first as a packer, and afterwards as a Portugal merchant, till he lost all he had through the failures that followed the Lisbon earthquake of 1755, in which also his second son perished. William, his third son, was admitted a king's scholar of Westminster School in 1753, was thence elected a scholar of Trinity College, Cambridge in 1757, and in 1761 he took his degree of B.A., and was chosen a Fellow of his college. The next year he was appointed one of the ushers of Westminster School; and in 1771, having passed through the previous gradations, he rose to be second master of the school. In 1778, on the death of Dr. Smith, Dr. Vincent succeeded him as head-master of Westminster School. This situation he continued to hold, discharging its duties with distinguished ability, till he was made dean of Westminster, in 1802. He died at his residence in Westminster, Dec. 21, 1815.

Dr. Vincent's works consist of sermons, and small miscellaneous papers and essays. His chief works are, 'The Voyage of Nearchus to the Euphrates, collected from the original journal preserved by Arrian,' 4to., 1797; and 'The Periplus of the Erythræan Sea, part first,' &c., in 1800. The second part appeared in 1805. Both the works were republished together, in two volumes 4to., in 1807, under the title of 'The History of the Commerce and Navigation of the Ancients in the Indian Ocean.' His 'Defence of Public Education,' &c., 8vo., 1802, was written while he was master of Westminster School; and Mr. Addington, who was then first lord of the Treasury, was so much pleased with it, that he gave him the deanery of Westminster.

VI'NCI, LIONA'RDO DA, was born at Vinci in the Val d'Arno below Florence, in 1452. His father, Pietro da Vinci, was a notary. Lionardo evinced as a boy remarkably quick abilities, particularly in arithmetic, music, and drawing. Andrea Verrocchio, the painter, took him as his pupil, and soon felt so keen a sense of his own inferiority, that he gave up painting altogether. The first original picture of Lionardo's, mentioned by Vasari, was the so-called Rotella del Fico, a round board of fig-tree, upon which, having collected almost every kind of reptile, he painted from them a monster of a most strikingly horrible appearance. This painting his father sold for a hundred ducats, and it was afterwards sold to the duke of Milan for three hundred ducats.

Although Lionardo devoted himself enthusiastically to painting, he appears to have found time also to study many other arts and sciences—sculpture, architecture, engineering, and mechanics generally, botany, anatomy, mathematics, and astronomy; he was also a poet and an excellent extempore performer on the lyre. He was not only a student in these branches of knowledge, but a master. A letter which he wrote to the duke of Milan, probably about 1483, proposing some improvements in engineering, for both peace and war, induced the duke to take him into his service, with a salary of 500 scudi per annum.

Though Lionardo devoted more time to painting than to anything else, he did not make many designs before he went to Milan. Among the few were a Cartoon of Adam and Eve, for the king of Portugal, to be worked in tapestry in Flanders; and the Medusa's Head, now in the Florentine gallery. In Milan, besides performing various services for the duke, Lionardo established an academy of arts about 1485, and formed a great school. His first public work of art was the model for a bronze equestrian statue of Francesco Sforza. When the duke went to meet Charles VIII. at Pavia in 1494, Lionardo accompanied him, and while there he studied anatomy with Marc Antonio della Torre. About 1495 he wrote a treatise upon the respective merits of painting and sculpture, and dedicated it to the duke, but it is now lost.

In 1497 he commenced his painting of the Last Supper, on a wall of the refectory of the Dominican convent of the Madonna delle Grazie. One of the best copies is that in the Royal Academy of London, made by Marco Oggioni: there are

twelve old copies still extant. The demolition of the original was completed at the time of the Revolution, by some French soldiers. When the French in 1499 entered Milan, the soldiers broke up Lionardo's model for the statue of Francesco Sforza. After this event Lionardo returned to Florence in 1500. He was well received by Pietro Soderini, the gonfaloniere, who employed him, and assigned him an annual pension. His first great work was the Cartoon of St. Anne, for the church of the Annunziata; and he executed about the same time the portrait of the Madonna Lisa, the wife of Francesco del Giocondo, now in the Louvre.

In 1502 he was appointed architect and chief-engineer to Cesare Borgia, captain-general of the pope's army; but in 1503, after the death of Pope Alexander VI., he was again in Florence, and was employed by Soderini to paint one end of the council-hall of the Palazzo Vecchio. This composition, of which Lionardo made only the cartoon of a part, was called the Battle of the Standard. In 1507 Lionardo again visited Milan, and painted between that year and 1514 several portraits, and a Madonna and Child. He then went to Rome, and was introduced by Giuliano de' Medici to Leo X., who was about to employ him, but soon offended him by a want of courtesy and perhaps still more by sending for Michel Angelo, and he therefore set out for Pavia to enter into the service of Francis I. of France, who received him with the greatest kindness and took him into his service, with an annual salary of 700 crowns. Da Vinci accompanied the king to France in 1516, but his health after he left Italy was so enfeebled that he executed little or nothing. It gradually grew worse, and he died at Fontainebleau, May 2, 1519.

Of Lionardo's numerous treatises few have been published. The best known is that on painting, 'Trattato della Pittura,' which has been twice translated into English. Lionardo's greatest literary distinction however is derived, says Mr. Hallam, 'from those short fragments of his unpublished writings that appeared not many years since; and which, according at least to our common estimate of the age in which he lived, are more like revelations of physical truths vouchsafed to a single mind, than the superstructure of its reasoning upon any established basis. The discoveries which made Galileo, and Kepler, and Maestlin, and Maurolicus, and Castelli, and other names illustrious, the system of Copernicus, the very theories of recent geologers, are anticipated by Da Vinci, within the compass of a few pages, not perhaps in the most precise language, or on the most conclusive reasoning, but so as to strike us with something like the awe of præternatural knowledge.' The extracts alluded to were published at Paris in 1797, by Venturi, in an essay entitled 'Essai sur les Ouvrages Physico-Mathématiques de Léonard da Vinci, avec des Fragmens tirés de ses Manuscrits apportés de l'Italie.' These manuscripts were afterwards restored to Milan where they are still preserved under the name of the 'Codice Atlantico.'

VINCULUM, a name given in algebra to the line, brackets, parentheses, or other symbol, by which various terms are compounded into one, or supposed to be so compounded, in order that the result may be further operated on. As in

$\overline{a+b+c}\,x$, $(a+b+c)\,x$, $\{a+b+c\}\,x$, &c.,

which are, by the vinculum, prevented from being confounded with $a+b+cx$.

VINDHYA MOUNTAINS. [HINDUSTAN.]

VINE. [VITIS.]

VINEGAR, a dilute acetic acid obtained by the vinous fermentation. [ACETIC ACID; FERMENTATION.] In countries which produce wine vinegar is obtained from the acetous fermentation of wine; but in this country it is usually procured from malt, and the process employed resembles the first stages of the brewer's operations. [BREWING.] The malt is ground and mashed with hot water. The wort, after being cooled, is transferred to the fermenting tun, where by the addition of yeast it undergoes the acetous fermentation; and when this is over the liquor is transferred to small vessels, which are kept warm by means of a stove: in these it remains for a shorter or longer period, according to the temperature of the stove and the strength of the liquor. The process of acetification is assisted by introducing into the casks with the wort what is called *rape*, which is a quantity of the residuary fruit which has served for making domestic wines, or has been preserved by the vinegar-maker from one process to another in his own factory. The use of the rape is to act as an acetous ferment, and thus induce sourness in the wash, it being well impregnated with vinegar and continually kept sour. Acetification is sometimes carried on by transferring the wort, after it has undergone the vinous fermentation, into casks, the bungholes of which are left open and loosely covered with tiles; the casks are then exposed for a long time to the air; but the use of stoves has greatly superseded this mode, has abridged the time of the operation, and rendered it less liable to failure. The vinegar, after it has reached its greatest degree of sourness, is rendered clear and fit for use either by subsidence or the employment of isinglass.

Vinegar may be prepared in small quantities from the fermentation of a solution of sugar mixed with yeast; or it may be obtained by the fermentation of various fruits; thus the juice of good apples contains a sufficiency of sugar to afford tolerably good vinegar without any addition.

In France vinegar is made from poor wine; and there are two kinds—the white, prepared from white wine; and the red, by the acetification of the red wine: these are finer flavoured and somewhat stronger than the malt vinegar of this country.

Medicinal Properties of Vinegar.—Vinegar produces very different effects according to its degree of concentration; its effects are also different on the dead and living organic tissues. It acts as an effectual preservative from the putrefactive fermentation of dead organic tissues, and is hence employed as the means of forming pickles, or meat in a dried state, by simply immersing the substance in it for a few minutes. Wood vinegar, or pyroligneous acid, is most efficacious for this purpose, owing to the creasote present in it. Crude pyroligneous acid is one of the most effectual ap-

plications to timber, both to prevent the dry-rot and the ravages of insects. Concentrated acetic acid acts on the living tissues as a caustic poison; applied to the skin it causes heat, redness, and rapid inflammation. The same is the case when taken into the mouth or applied to any mucous membrane, which it blackens like sulphuric acid. When properly diluted and used in moderation, it heightens the vitality of the stomach and greatly promotes the digestive powers.

VINER, CHARLES, died June 5, 1756, at his house, Aldershott, Hampshire. When or where he was born has not been recorded. He was the compiler of a 'General and Complete Abridgment of Law and Equity,' 24 vols. folio, 1741–1751, and the founder of the Vinerian Professorship of Common Law in the university of Oxford. The 'Abridgment' was printed at his own house, at Aldershott. The 24th volume is an Index, by a gentleman of Lincoln's Inn. This stupendous work was reprinted in 24 vols. royal 8vo., 1792–1794, and was followed by six supplemental volumes, royal 8vo., 1799–1806.

Viner bequeathed by his will, dated December 29, 1755, about 12,000*l.* to the Chancellor, Master, and Scholars of the university of Oxford, to establish a Professorship, and to endow such Fellowships and Scholarships of Common Law in the university as the produce of his legacy might be thought capable of supporting. The professor is to read a lecture in the English language within a year after his admission, and a course of lectures on the laws of England every year in full term. The course is to consist of at least twenty-four lectures, to be read in one and the same term, with such intervals that not more than four are to be read in a week. As relates to the reading of the lectures, Easter and Trinity Terms are reckoned as one Term. There are at present two fellowships of 50*l.* a year each, and five scholarships of 30*l.* a year each. They are tenable for ten years. Blackstone, the author of the 'Commentaries,' was the first Vinerian Professor.

VIOL, an ancient musical instrument, which may be considered as the parent of all modern instruments of the violin family. It was a fretted instrument, of three sorts—treble, tenor, and base, each furnished with six strings, and played on by a bow. The Treble Viol was rather larger than our violin, and the music for it was written in the treble clef. The Tenor Viol was in length and breadth about the size of the modern viola, but thicker in the body, and its notation was in the soprano or C clef. The Base Viol scarcely differed in dimensions from our violoncello: the music for it was written in the base clef.

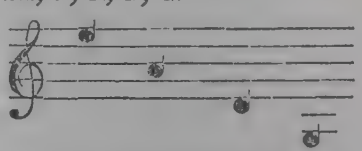
VIOL DA GAMBA was the last survivor of the family of viols. It derived its name from being held between the legs. It has been superseded by the violoncello.

VIOLA, or TENOR-VIOLIN, a larger kind of violin, to which the part between the second violin and base is assigned. It has four gut strings, the two lowest covered with silver wire, which are tuned A, D, G, and C, an octave above the violoncello.

VI'OLA, a genus of plants, the type of the natural order *Violaceæ*. *V. odorata*, Common Sweet Violet, is a native throughout the whole of Europe, and in Siberia and China. It is common in England, but is a rare plant in Scotland and Ireland. Wherever this plant grows, its delicious scent has made it a great favourite. *V. hirta*, the Hairy Violet, is a native of thickets and groves throughout the whole of Europe, and is not uncommon in England, though rare in Scotland. *V. canina*, Dog's Violet, is common in Britain, and is a native of hedges, thickets, and heathy grounds throughout almost all Europe, in Japan, Persia, the north-west coast of North America, and the Canary Islands. The flowers are blue and scentless. *V. tricolor*, Three-Coloured Violet, Heart's-Ease, or Pansy, is a native of cultivated fields and gardens throughout Europe, Siberia, and North America. The petals vary exceedingly in colour and size, and this tendency has been taken advantage of by the floriculturist for producing varieties of this flower, and at the present day there is no flower receiving more attention than the pansy.

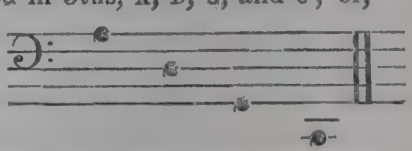
VIOLA'CEÆ, or VIOLA'RIEÆ, a natural order of plants belonging to Lindley's parietose group of polypetalous Exogens. All the *Violaceæ* possess in a greater or less degree emetic properties, which reside principally in their roots.

VIOLIN, a musical instrument known, in some shape, in most countries, and from very early times. The modern violin has four gut strings, the last, or lowest, covered with silver-wire. These are tuned in 5ths, E, A, D, G.



The wood is generally of three sorts. The back, neck, sides, and circles, are of sycamore: the belly, bass-bar, sound-post, and six blocks, of deal: the finger-board and tail-piece of ebony. The finest violins are those which were made at Cremona, by the family of the Amati, and by Straduarius and Guarnerius.

VIOLONCELLO, a musical instrument of four gut strings, the two lowest covered with silver-wire, and tuned in 5ths, A, D, G, and C; or,



VIPER. [SERPENTS; VIPERIDÆ.]

VIPE'RIDÆ, a family of venomous serpents, including, according to some zoologists, the true Vipers, the Cobras, and the Rattlesnakes. The Cobras constitute a distinct family, and have been already noticed. [NAIA.] The Rattlesnakes may be properly ranged under the *Viperidæ*.

In Europe our Common Poison-Snake is the Viper (*Vipera vulgaris*, Ray; *Vipera communis*, Leach). This snake is subject to variations of colour, which, as Mr. Bell observes, have led to the erroneous multiplication of species.

The Common Viper is probably the Ἔχις (*Echis*) of Aristotle and the Greeks, and the *Vipera* of Virgil ('Georg.,' iii. 417), Pliny ('Nat. Hist.,' viii. 39; x. 42; xi. 37), and the Romans.

It is the *Marasso* of the Italians; *Vipère* of the French; and *Adder* of the English (anciently written *Nedre*, and later *Eddre*, with the loss of the initial *n*, from the Anglo-Saxon *Nædre*).

Geographical Distribution.—Europe generally, from the north of Russia to the south of Italy and Spain. England and Scotland, but not Ireland.

The poison of the viper, although not generally fatal, at least in our island, to man, or the larger animals, proves almost immediately destructive to small creatures such as mice, frogs, young birds, &c., on which it habitually feeds. Open copses, dry heaths, and sandy spots, are the favourite resort of this species. Hybernates, intertwined with several of its own species. Tail blunt compared with that of the common snake. Length from 18 inches to two feet. The number of young produced at a birth varies from 12 to 20. (Bell's 'British Reptiles.') They display as soon as they enter into the world the true viper-spirit.

Asia and Africa present us with many venomous snakes besides the Cobra. [NAIA.] Of these we may adduce the *Cerastes*, or Horned Snake. One species, the Egyptian *Cerastes*, was well known to the ancients, and appears figured on the monumental relics of Thebes. This is the snake of which Herodotus (lib. 2) speaks in the following passage :—'There are about Thebes sacred serpents, entirely innocuous to man; they are of diminutive size, and have two horns sprouting from the crown of the head; when they die they are buried in the temple of Jupiter, to whom they are said to be sacred.' Herodotus was in error in saying these snakes were innocuous. Perhaps he had examined only tame individuals from which the poison-fangs had been extracted, or confounded the *Cerastes* with some truly harmless species. This snake was devoured by the sacred Ibis. [ABOU-HANNES.]

Dr. Smith describes a new species of Cerastes (*C. caudalis*, *Vipera ocellata*, Smith) from South Africa. Like the Egyptian *Cerastes*, this snake is sluggish and indolent, although when roused capable of exerting wonderful activity. It seizes its prey, or enemy, holding on with extreme tenacity of tooth. Sandy districts are its favourite abode.

Dr. Smith in the same work ('Zoology of South Africa') describes a viper under the title of *Echidna inornata*, and gives the following general review of the poisonous snakes of this part of the world. Of the genus *Vipera* (including *Cerastes*), he observes that there are in South Africa the following species, viz. :—*Vipera arietans*, *V. atropos*, *V. cornuta*, *V. inornata*, *V. ocellata* (*caudalis*), *V. atropoïdes*, *Echidna atropos*, *E. inornata*, *E. atropoïdes*, *Cerastes cornutus*, and *C. ocellatus* (*caudalis*).

Dr. Smith notices the fact that the vipers and one or two species of *Elaps* are the only snakes of South Africa which permit themselves generally to be closely approached without evincing any apparent concern. The others manifest a disposition to act on the offensive or to fly. Even an unusual noise is sufficient, he remarks, to insure the retreat of the innocuous ones.

In South America and the West India Islands are several species of venomous serpents. In Martinico and St. Lucia the Lance-Headed Viper (*Trigonocephalus lanceolatus*) is a dreaded pest; nor less so the Bushmaster (*Lachesis rhombeata*) in Guiana and Brazil. In St. Lucia the Rat-Tail (*Craspedocephalus atrox*) annually destroys several persons. ('Proceedings of the Zoological Society,' 1849, p. 100.)

The Common Rattlesnake (*Crotalus horridus*) is common in Virginia, the Carolinas, and other parts of America. It has been said to fascinate its victims. The truth is that they are paralysed by extreme terror, and sink before the approach of their sluggish aggressor. In these reptiles, which often attain to a large size, the tail is furnished with a singular apparatus, consisting 'of a number of thin horny cells of a pyramidal figure, with a protuberant marginal ring. They are fitted into one another as far as this ring; that is, the pyramidal portion of one is received into the hollow of that succeeding it, its apex reaching as far as the ring of the third, and so on. Hence when altogether the protuberant margin of each is alone visible. The articulation of these distinct portions being very loose, they rustle against each other when smartly vibrated, and produce a distinct whirring noise that may be heard at some distance.' The number of the joints of this rattle increase, to a certain period at least, with each moult of the slough, and the basal bell is the last formed. The virulence of the poison of the Rattlesnake depends greatly on the time of the year; it is most fatal during the hotter months. These dreaded reptiles often enter houses, barns, &c., and were they as active and malicious as the Cobra, more frequent instances of the death of man from their bite would be recorded. They are not prone, unless driven to extremity, to use their weapons.

The Small Rattlesnake (*Claudisona miliaris*), and the Water Rattlesnake (*Tisiphone Shawii*), are both natives of the Carolinas. In the latter the tail terminates in a simple spine.

Australia contains several deadly snakes, the Brown Snake, the Yellow Snake, the Black Snake, and Death-Adder. The latter belongs to the genus *Acanthophis*, its tail terminating in a horny spine.

VIRÉ. [CALVADOS.]

VIRGI'LIA, a small chiefly tropical genus of the large natural family of *Leguminosæ*, named by Lamarck in compliment to the poet Virgil. Several species are natives of the Cape of Good Hope.

VIRGI'LIUS, or VERGILIUS, PUBLIUS MARO, was born at Andes, a small place near Mantua, on the 15th of October, B.C. 70, in the first consulship of Cn. Pompeius Magnus and M. Licinius Crassus. He was five years older than Horace, who was born B.C. 65, and seven years older than the Emperor Augustus. He was instructed in the neighbouring towns of Cremóna and Mediolanum (Milan). It is apparent from the writings of Virgil that he had a learned education, and traces of Epicurean opinions are obvious in his poetry. When a division of lands in Italy was made among the veteran soldiers of Octavianus, Virgil lost his patrimony at Mantua

(B.C. 41), but it was restored to him by Octavianus, through the intercession of some powerful friends, among whom are mentioned Alfenus Varus, Asinius Pollio, and Mæcenas. His first Eclogue is supposed to allude to the loss of his lands and his recovery of them. Virgil probably afterwards resided at Rome, and he was in favour with Mæcenas, who was a patron of letters, and with the Emperor Augustus. Horace attributes his own introduction to Mæcenas to Virgil and Virgil's friend Varius. Virgil also spent part of his time at Naples and Tarentum. In B.C. 19 he visited Greece, where he intended to spend several years, for the purpose of perfecting his epic poem, the 'Æneid.' It was on the occasion of this voyage that Horace addressed to him one of his lyric poems ('Carm.,' i. 3). At Athens Virgil met with Augustus, who was returning from the East, and he determined to accompany Augustus back to Rome: but he fell sick at Mégara, which city he visited probably on his road to Rome, and his illness was increased by the voyage to Italy. He lived however to reach Brundisium, where he died in the autumn of the year B.C. 19. According to his wish his body was taken to Naples, and interred on the Via Puteolana, at the second milestone from Naples. The place of his burial is still pointed out by tradition, though the so-called tomb at Posilipo cannot be considered as the monument of the Roman poet.

The 'Bucolica' of Virgil, his earliest works, consist of ten short poems, which are commonly called 'Éclogæ,' or selections, a name which may have been given them after Virgil's time. They were probably written between B.C. 41 and B.C. 37. They are not bucolic poems so strictly as most of those of Theocritus; some of them are merely allegorical poems in a bucolic dress. Though Virgil introduces shepherds and rustic scenery and allusions, he fails in giving to these poems a genuine rustic character. There are many good lines in them, but the want of reality makes them cold and unmeaning. He has borrowed many lines from the Greek writers, and especially from Theocritus.

The 'Georgica,' a didactic poem, in four books, addressed to Mæcenas, is the best work of Virgil. In the first book he treats of the cultivation of the soil, in the second of fruit-trees, in the third of cattle, and in the fourth of bees. The fourth book has but a meagre subject, but it is well handled, and the materials, which would have been insufficient for a book of the same length as the others, are made up by the long story of Aristæus. His taste and judgment were improved when he wrote the 'Georgica.' If the concluding lines of the fourth book are genuine, Virgil was finishing this poem at Naples about B.C. 30.

The 'Æneid' of Virgil is the great national epic of the Romans. It is said to have been left imperfect, and to have been published by Tucca and Varius after Virgil's death. The poem consists of twelve books, which contain the story of the wanderings of Æneas after the fall of Troy, and his final settlement in Latium after the defeat of Turnus and the Rútuli. Though the adventures of Æneas are the direct subject of the 'Æneid,' the glories of Rome and the fortune of the Julian House, to which Augustus belonged, are skilfully interwoven in the texture of the poem. The foundation of Alba Longa, and the transfer of the seat of empire from that city to Rome, are announced in the first book of the 'Æneid,' by Jupiter, to be the will of the Fates; and the great family of the Cæsars is declared to be the descendant of Æneas. The adventures of the Trojan hero at the court of Dido, queen of Carthage, give occasion to hint at the future rivalry between the Romans and the Carthaginians, and the long contest which was destined to end in the triumph of the descendants of the Trojan hero. The numerous allusions to actual circumstances and to the history of the republic were adapted to create or to confirm a popular notion of the Trojan descent of the Romans. Though the 'Æneid' contains many fine passages, its poetical merits are greatly below those of the 'Iliad' and 'Odyssey.' The poem wants the unity of purpose and integrity of construction which so eminently characterise the 'Iliad,' and it is deficient in that truth and simplicity which form the never-tiring charm of both the 'Iliad' and the 'Odyssey.' But Virgil had other models besides Homer. The poets of the Alexandrine school were his study, and particularly Apollonius of Rhodes, whom he has often imitated. The 'Æneid' contains many obscure passages; and though Virgil is generally used for early instruction, he is one of the most difficult of the Roman poets. Several short poems attributed to Virgil are printed in some editions of his works,—'Culex,' 'Ciris,' 'Copa,' 'Moretum,' and 'Catalecta,' a collection of fourteen smaller poems.

The editions of Virgil are very numerous. That of P. Masvicius, Leovardiæ, 1717, 2 vols. 4to., contains the commentaries of Servius, Philargyrius, and Pierius, with very copious indexes. The edition of C. G. Heyne's Virgil, by G. P. E. Wagner, Lipsiæ, 1830, &c., 4 vols. 8vo., is the most complete. The text may be bought separate in a single volume.

The German translation of Virgil, by J. H. Voss, is very good. Martyn's prose translation of the 'Bucolics' and 'Georgics' has a good commentary. Gawin Douglas translated the 'Æneid' into Scottish verse. There are English versified translations by Ogilby, Dryden, and Trapp. Pitt translated the 'Æneid,' and Joseph Warton the 'Bucolics' and 'Georgics.' The latest translation is into English blank verse: 'The Works of Virgil translated (the first 4 Pastorals, the Georgics, and the first 4 Æneids, by the Rev. Rann Kennedy; the last 6 Pastorals and the last 8 Æneids, by Charles Rann Kennedy),' 2 vols. 8vo., 1849.

VIRGI'LIUS, or VERGILIUS, POLYDO'RUS, was a native of Urbino in Italy. He first made himself known by a small collection of Adagia, or proverbs, which he published in 1498. Being in holy orders, he was before 1503 sent over to England by Pope Alexander VI. to collect the tax called Peter-Pence; and he spent the greater part of the remainder of his life in this country, continuing his residence long after he

lost his office, of which he was the last holder. In 1517 he republished at London his work 'De Rerum Inventoribus,' extended to eight books.

Soon after he came to England Virgilius obtained the rectory of Church Langton in Leicestershire; and in 1507 he was made archdeacon of Wells. He had also other preferments. In 1525 he published at London, in 8vo., from a very imperfect copy, the first edition of the fragments of Gildas 'De Calamitate,' &c. In 1533 he finished his 'Historia Anglica,' or History of England, in twenty-six books, from the earliest times to the end of the reign of Henry VII. The work is dedicated to Henry VIII. His narrative is clear, and his style good, though he does not rank high as an authority. He left England in 1550, but was allowed to retain his archdeaconry and a prebend in the cathedral of Hereford. The time of his death seems to be uncertain.

VIRGIN ISLANDS are an extensive group of small islands in the West Indies. They lie between 18° 5′ and 18° 50′ N. lat., and between 64° 10′ and 65° 40′ W. long. They extend in nearly a straight line from W.S.W. to E.N.E., and occupy a space of about 100 miles in length, with an average width of 20 miles. The group consists of about 100 islands, islets, and rocks, of which probably not more than 25 are inhabited and cultivated. The most eastern islands belong to the British; those in the centre to Denmark; and the most western are considered as an appendage of the Spanish island of Puerto Rico.

The *British Virgin Islands* lie between 64° 10′ and 64° 50′ W. long., and amount to about 50 in number; but most of them are very small, and only a few of moderate extent. The largest of these islands are, Anegada, Virgin Gorda, and Tortola. *Anegada* is 10 miles long by 4 broad. The produce is scanty and the inhabitants few. *Virgin Gorda* is a rocky island, which produces sugar, rum, tobacco, indigo, peas, and cotton. *Tortola*, the most important of the British Virgin Islands, is an elongated island, about 12 miles long by 2 wide. It is a mountain-mass, broken up and furrowed by glens and ravines in every direction; and the shores are indented with bays, harbours, and creeks, which, together with the adjacent small rocks, afford shelter and anchorage for shipping. The capital of the island, Road Town or Kingstown, consists of only one long irregular street.

The *Danish Virgin Islands* lie between 64° 40′ and 65° 10′ W. long., and consist of St. John, St. Thomas, Santa Cruz, and a considerable number of islets. *St. John* is 8 miles long by 3 wide; it is in general too mountainous to allow much level surface for culture; but it grows nearly enough for the consumption of the inhabitants. At the western extremity is the small town of St. John, which has a pretty good harbour. There are about 3000 inhabitants. *St. Thomas* is about 12 miles long by 2½ broad; it is very uneven, and of indifferent fertility. Most of the white inhabitants are of Dutch origin, and Dutch is the common language. The population is about 8000. The town of St. Thomas is built on the north shore of a fine bay; it is a well-built town, with a good trade, arising from its having been declared a free port. *Santa Cruz* is the most important of the Danish possessions in the Columbian Archipelago; it is about 24 miles long by 8 broad, and is very fertile. The whole island is divided into 346 plantations, each containing 150 acres, of which number 155 are planted with the cane, and the others produce cotton and provisions. The population is nearly 40,000; the greater number of the whites are of English origin, and English is the most common language. The chief town, Christianstadt, is one of the best built in the West Indies; the streets, houses, churches, and public buildings, all being of respectable character.

The *Spanish Virgin Islands* are at a short distance from the eastern coast of Puerto Rico, and consist of two islands of moderate extent, Culebra and Bieque, and of several islets. *Culebra (Snake Island)*, or *Passage Island*, is about 8 miles long by 1 broad; while *Bieque*, or *Crab Island*, is 16 miles long by 4 broad; they have very few inhabitants, and have not hitherto acquired commercial or political importance.

The Virgin Islands, taken collectively, have two rainy and two dry seasons; and the climate is subject to much fluctuation in heat and winds. The islands are also subject to earthquakes, but the shocks are slight, and not attended with such dreadful consequences as in the Antilles, which are farther to the south-east. The northern shores are exposed to a very heavy swell of the sea, called 'the ground-sea.'

Besides the staple articles mentioned before, several plants are cultivated which yield occasionally articles of exportation, as ginger, turmeric, tobacco, pimento, and indigo. Roots, kitchen-vegetables, and fruits, are abundant. Plantains, bananas, cocoa-nuts, castor-oil plant, tamarinds, mahogany, and fustic, are among the produce either of the fields or the forests. A few domestic animals are kept, but most of them are imported from the Spanish Main. There are no wild quadrupeds, and birds are rare. Salt is obtained from several lagoons, which dry up in summer.

Santa Cruz and the Virgin Islands were discovered by Columbus on his second voyage, 1494. Their subsequent history is little else than a series of struggles for them between the English, French, Dutch, and Spanish; and the present partition has only been settled during the present century. The British islands are under the authority of the governor of St. Kitt's, but they have a separate legislative assembly, which meets at Road Town. The Danish islands are governed by the Danish governor residing at Christianstadt. The Spanish islands are appendages of Puerto Rico.

VIRGIN'S BOWER. [Clematis.]

VIRGINAL, a musical instrument now entirely disused. It was a keyed instrument of one string, jack, and quill, to each note, like a spinet, but in shape resembling the present small pianoforte. The compass was from the 2nd added line below the base to the 2nd added line above the treble, or four octaves.

VIRGINIA. [Decemviri.]

VIRGINIA, one of the United States of North America, is situated between 36° 33′ and 40° 43′ N. lat., and 75° 25′ and 83° 40′ W. long. It is bounded N. by Pennsylvania and Maryland, S. by North Carolina and Tennessee, W. by Kentucky, and E. by Chesapeake Bay and the Atlantic Ocean. Its greatest length E. to W. is along 36° 35′ N. lat., where it measures 370 miles. The greatest width N. to S. is 250 miles. The area is 64,000 square miles. The population in 1840 was 1,239,797, of whom 448,987 were slaves.

Coast.—The southern part of the peninsula which separates Chesapeake Bay from the Atlantic belongs to Virginia, and is surrounded by the sea, except on the north, where it borders on Maryland. Chesapeake Bay is 15 miles wide at the entrance, and extends inland in a N. direction about 180 miles. It is indented by many bays on both sides, and contains several islands. The larger bays are the æstuaries of rivers, and admit large vessels, so as to constitute good harbours. The smaller bays are formed by indentations of the shores, and most of them have safe anchorage for coasting vessels. The headlands between the bays have low and frequently swampy shores, but at some distance from them the country rises from 15 to 20 feet. That part of Virginia which lies east of the Chesapeake Bay is skirted on the side of the Atlantic by many low sandy islands, which towards the north form one row, but towards Cape Charles two or three parallel rows.

Surface, Soil, Climate, Productions.—Nearly one-half of the surface of Virginia is mountainous. The Appalachian Mountains run through it obliquely from S.W. to N.E., spreading along the southern boundary over the western districts of the state, and towards the north over the central districts. The S.E. boundary-line of this mountain-region is marked by the Blue Ridge. This chain enters Virginia on the south at 80° 30′ W. long., and terminates on the banks of the Potomac east of Harper's Ferry, near 77° 40′ W. long. The S.W. part of the state is entirely mountainous; and the N.W. limit of the mountain-system may be marked by a straight line drawn from the point where the Big Sandy River begins to separate Virginia from Kentucky, to the confluence of the two principal branches of the Monongahela in Pennsylvania. All the countries included between this line and the Blue Ridge constitute the mountain-region of Virginia. From the eastern base of the Blue Ridge a plain extends to the shores of Chesapeake Bay and the Atlantic. This plain presents itself under two different aspects. Along the shores of the sea it is low and undulating, and at the back of it is a higher hilly country, which reaches to the Blue Ridge. That portion of Virginia which is N.W. of the mountain-region, between it and the Ohio and Big Sandy River, is much more hilly than the eastern plain, and may be called the hilly region of the Ohio and of the Kanawha. The following table exhibits a rough estimate of the respective areas of these four regions:—

	Square Miles.
1. Lower Slope to the Atlantic .	8,000
2. Upper Slope to the Atlantic .	18,000
3. Central Mountain-Region . .	28,000
4. North-Western Hilly Region .	10,000
	64,000

1. *The Lower Slope to the Atlantic* comprehends also the eastern shore of Virginia, or that part which lies east of Chesapeake Bay. This tract consists of a tongue of land about 7 miles in width. From N. to S. it extends 70 miles. Along the shores it is mostly covered with low sand-hills or swamps; but this sterile tract is hardly half a mile wide, and the interior is a level flat country, with a pretty good soil. The principal crops are Indian-corn and oats. The area of this tract is about 500 square miles.

The Lower Region west of Chesapeake Bay has its western limit marked by the first waterfalls of the rivers which traverse it from W. to E. These falls occur where the general level of the country has a considerable descent from the Upper Slope. The S.E. portion of this region, or that which lies S. of the æstuary of the James River, is a flat country, with a soil less fertile than the eastern shore. On some low tracts near the Dismal Swamp rice is cultivated. The Dismal Swamp extends into Virginia from North Carolina S. to N. about 30 miles, and is about 10 miles wide. The soil of the swamp is a complete quagmire, trembling under the feet, and filling immediately the impression of every step with water. The other parts are covered with cypress and cedar-trees, and on the western border with pines. Near the centre of the swamp, in Virginia, is Lake Drummond, which extends about 7 miles in every direction, and varies in depth from 10 to 20 feet. The remainder of the Lower Region has level tracts along the æstuaries; but at a short distance from the rivers the country rises, and presents an undulating surface, which towards the western limits of the region is diversified with hills. The soil is alluvial, but often thin, and the greater part of the substrata is composed of sand and pebbles. The river-valleys have a deeper soil. Indian-corn, oats, potatoes, and sweet potatoes, are extensively grown; tobacco is also cultivated.

The climate of this low region is distinguished by great and sudden changes. The frosts in winter are sometimes very severe; the rivers and æstuaries are covered with ice, sometimes strong enough to be crossed by men and horses. But the frosts are generally of short duration, and followed by very mild weather. The winter in London is more temperate by one degree than it is at Richmond in Virginia, while the summer is less hot by 13½ degrees. Richmond is 14° farther S. than London.

2. *The Upper Slope to the Atlantic* extends from the western limit of the Lower or Maritime Slope to the Blue Ridge. From the base of the ridge the country descends to the falls of the rivers in an inclined plain. Where the falls occur, a ledge of rocks extends across the state, rising from 100 to 200 feet above their base, which in most places is about 100 feet above the sea-level. From this ledge the rise of the country towards the mountains is continual, but irregular. Its

general level, where it joins the mountains, is from 500 to 600 feet above the sea. This region generally extends in undulating plains. The hills, which are not numerous, rise from 300 to 500 feet above their bases. They are generally overgrown with timber-trees. The soil of the higher grounds has in general a moderate degree of fertility, and the cultivated tracts yield moderate crops of wheat, Indian-corn, tobacco, and oats, and also rye and buckwheat. The orchards are extensive, and produce apples, pears, cherries, plums, figs, peaches, and mulberries. The mean annual temperature is from three to six degrees lower than in the Lower Region.

3. *The Mountain-Region* extends from S.W. to N.E., through the centre of Virginia. Its eastern limit is well marked on our maps by the Blue Ridge, which is about 260 miles in length; but that is not the case with the western boundary, because on that side several offsets of the mountains extend north-west into the hilly region of the Ohio and Kanawha. The Alleghany Mountains occupy a greater width in Virginia than in any other of the states. The successive ridges from the Blue Ridge westwards have various names, as the Iron Mountains, Clinch Mountains, and Cumberland Mountains in the S. Farther N. are the Greenbrier Mountains, the Laurel Hills, the Kittatinny Chain, and the Backbone Mountains. Between the various ridges there are long valleys or table-lands, often of considerable width, and affording some of the best and most pleasant land in Virginia. The general elevation of the ridges seems to vary between 2500 and 3000 feet, except towards the banks of the Potomac, where it sinks to between 1400 and 1000 feet above the sea. The mountains are generally covered with large timber-trees. The valleys are partly in grass, and partly cultivated with wheat, maize, potatoes, hemp, flax, wines, apples, pears, and other productions.

It is obvious that the climate must greatly vary in the mountain-region. The winters are more severe than in the countries east of the Blue Ridge, and they generally last three months without interruption.

4. *The Hilly Region of the Ohio and Kanawha* comprehends the N.W. portion of the state. This region is considerably elevated above the sea, the mouth of the Great Kanawha being 481 feet above the sea. The most southern portion of this region is the most elevated, and the surface is mountainous. The remainder is only hilly, with the exception of the north-eastern country, where some short ranges of mountains occur. The hills rise from 300 to 500 feet above the river-valleys, generally with a gentle acclivity, though in many places they are steep.

The great mountain-system of which the mountains of Virginia form a portion, is described under Appalachian Mountains.

Rivers.—Virginia has numerous navigable rivers. They all originate within the Mountain-Region or on the ranges which form the edges of that region. The greater number run E. and S.E., and flow into the Atlantic. The others flow N. or N.W. into the Ohio.

The Potomac, from its source to its mouth, forms the boundary between Maryland and Virginia. The upper branches of this river drain the northern portion of the Mountain-Region. Its north branch, which is generally called simply the Potomac, rises in the Backbone Mountains, and it runs with many bends N.E. and E. to its union with the South Branch, which rises near 38° 30′ N. lat., and runs nearly 100 miles before it unites with the north branch. The united river passes through several ridges of the Mountain-Region with numerous bends, and shortly before it issues from the mountains it is joined by the Shenandoah. This large river rises near 38° N. lat., and drains nearly the whole of the Mountain-Region north of that parallel and between the Kittatinny Chain and the Blue Ridge. It flows 130 miles before it joins the Potomac. Immediately after the junction of the two rivers, the Potomac traverses the Blue Ridge by a narrow gap bounded by rocks, and enters the Atlantic Slope, through which it flows S.E. till it meets the tide-water at Georgetown, after which it becomes an æstuary, which gradually widens as it approaches Chesapeake Bay, and where it mingles its waters with the Chesapeake it is $7\frac{1}{2}$ miles wide. The Potomac may be navigated by the largest vessels as far as Alexandria, about 80 miles from its mouth, and by vessels drawing not more than 20 feet water to the Falls, which are 13 miles above Alexandria.

The Rappahannoc rises on the eastern declivity of the Blue Ridge, with two branches, which unite after a course of about 50 miles. The river then becomes navigable, but 10 miles farther down it has some falls, and a short distance below them it meets the tide-water at Fredericksburg. It may be navigated by vessels of considerable burthen up to Fredericksburg. Its course is about 160 miles.

York River originates in the South-East Mountains, with two branches, which unite after a course of about 100 miles, and form the York River, which is an æstuary from 1 to 3 miles across. After a course of 39 miles it falls into Chesapeake Bay. This river is very important for navigation. It admits the largest ships to Yorktown, 12 miles from the sea, where it forms an excellent harbour. Up to the union of its two branches it has a depth of three fathoms, and admits coasting-vessels.

The James River rises in that part of the Mountain-Region which lies between the Alleghany Mountains and the Kittatinny Chain, with two branches, which commence near 38° 30′ N. lat., and run for nearly 40 miles S., and then unite. The James River thus formed runs with great rapidity S. between high mountains, and turns to the E. above Pattonsburg, at which place it is 806 feet above the sea-level. It passes through the Blue Ridge at the Balcony Falls, which impede the navigation, but are avoided by a canal about 6 miles long. At Lynchburg the level of the river is 500 feet above the sea. Below Lynchburg it turns to the N.E., and runs with great rapidity, but is navigable. Lower down the current of the river becomes more

gentle till it approaches the falls above Richmond, where it descends 80 feet within 6 miles, and immediately below the falls it meets the tide-water. A canal connects the tide-water below and the navigable water above the falls. Below the falls the river gradually widens and becomes an æstuary, and after a course of 90 miles farther it merges in Chesapeake Bay. The wide expanse of its mouth affords a harbour for vessels of any size, but it is not safe in winter; this wide expanse is called Hampton Roads. Large vessels may sail up to James Town, more than 20 miles above Hampton Roads; but farther up there are only 15 feet of water. The direct length of this river is about 320 miles; but along the bends it is probably 500 miles. The largest of the affluents of the James River is the Appomattox, which rises at the base of the South-East Mountains, and runs about 150 miles. The Rivanna and the Willis River are two other affluents of the James River.

The upper course of the Roanoke lies within Virginia. This river rises in the Mountain-Region, about 2000 feet above the sea-level; but at Salem, about 15 miles from its source, it is only 1006 feet above it. After having passed through the Blue Ridge and the South-East Mountains, it runs E.S.E. with numerous bends until it enters North Carolina.

The Ohio divides Virginia from the state of Ohio, having between these two states a course of 355 miles. It is navigable all this distance for vessels of thirty or forty tons burthen, though there is a rapid above the mouth of the Great Kanawha River, called Letart's Rapids, over which the river runs for about half a mile with great velocity.

The Monongahela is one of the principal branches of the Ohio. [MISSISSIPPI, River.] The Little Kanawha joins the Ohio at Parkersburg. The Great Kanawha has its sources in the S.W. part of the State. It traverses the Mountain-Region by a course of 120 miles, running first N.E. and afterwards N.W. In these parts it is called the New River, and its course is very rapid. Where it is joined by the great branch, the Greenbrier River, it is still 1333 feet above the sea-level. From the place where the river is joined by Gauley River it bears the name of Kanawha. Two miles below that place are the Great Falls, a fine cataract of 22 feet over a natural dam of rocks. Below this place it becomes navigable, and at Charleston it is 300 yards wide and 20 feet deep at low-water. No obstruction to navigation occurs to its confluence with the Ohio, a distance of 70 miles.

Productions.—Most of the agricultural productions have been noticed. Though the forests still occupy the largest part of Virginia, very little timber is exported. The timber is of excellent quality in the Mountain-Region, but it cannot be brought to any place where it can be shipped without raising the price beyond the market-price of timber. The Hilly Region of the Ohio has also excellent timber-trees; and planks, boards, staves, &c., are exported from that region by means of the Ohio and its affluents.

Wild animals are now rare on the east side of the mountains, but they are still common in the western districts. The most common are bears, wolves, deer, the raccoon, squirrel, and opossum.

Virginia is very rich in minerals. In the Upper Atlantic Slope gold, iron, black-lead, copper, and limestone, are found. Coal is found in the neighbourhood of Richmond, and is worked at several places. Iron-ore is abundant along the base of the Blue Ridge. Lead-mines are worked in the Iron Mountains, near Austinville, not far from the southern boundary of the state.

Manufactures and Commerce.—The manufactures of Virginia are less extensive than those of some states inferior in territory and population. In 1840 there were 41 woollen manufactories and 47 fulling-mills, which produced goods valued at 2,441,672 dollars; 22 cotton manufactories; 42 cast-iron furnaces and 53 forges; 16 smelting-houses for lead and gold; 660 tanneries, and 982 leather-manufactories, as saddles, &c. The tobacco manufactured was valued at 2,406,671 dollars. There were numerous other manufactures of less importance. The exports in 1840 amounted to 4,778,220 dollars; the imports to 545,685 dollars.

Towns, &c.—Virginia is divided into 119 counties. *Richmond* is the seat of government. The following are the principal towns, with the population of each in 1840:—*Charlottesville,* a small town, 85 miles W.N.W. from Richmond, is situated on the Rivanna, and contains about 1000 inhabitants. There is a court-house, and 4 places of worship; and a preparatory school for boys destined for the university of Virginia, which is about a mile and a half distant from this town. The buildings of the university occupy three sides of an oblong quadrangle about 500 feet long by 150 wide. The principal building, called the Rotunda, is at one end of the quadrangle, of brick, circular, with a flattened dome, and a Corinthian portico. It is a copy of the Pantheon at Rome, and about one-half of the diameter of the original building. The University of Virginia was opened in 1825, and in 1849 had 212 students and 10 instructors. *Fredericksburg,* on the south bank of the Rappahannoc, 110 miles from the mouth, and 66 miles N. from Richmond, is a flourishing commercial town. Vessels of 130 or 140 tons burthen can ascend. There is a court-house, a gaol, a market-house, and 4 churches. It exports annually a large quantity of corn, flour, tobacco, &c. Population, 3974. *James Town,* where the first colony was settled, is now deserted. It was the seat of the colonial government from 1607 till 1698, when Williamsburg was made the capital, and continued to be so till 1779, when Richmond became the seat of the first American State government. The site is 65 miles S.E. by E. from Richmond. *Lexington,* 146 miles W. by N. from Richmond, is seated near the W. bank of North River, a tributary of the James River. It contains a court-house, gaol, 4 churches, Washington College (81 students), and the Virginia Military Institute (120 students). Population, 1200. *Lynchburg,* 116 miles W.S.W. from Richmond, is situated on the S. bank of James River, 20 miles below the Great Falls where the

river passes through the Blue Ridge. It has considerable trade, not only with western Virginia, but with North Carolina, Tennessee, Kentucky, and Ohio. The produce brought to market, consisting of tobacco, wheat, flour, hemp, &c., is conveyed in boats to Richmond, whence it is shipped to foreign markets. It has a court-house and 7 churches. Population, 6395. *Norfolk*, 106 miles S.E. from Richmond, is situated on the N.E. bank of Elizabeth River, 8 miles from its entrance into Hampton Roads. The harbour is excellent, sheltered from all winds, and has depth of water for the largest vessels. It has the largest foreign commerce of any place in the state. The situation is low, and the streets irregularly laid out. It contains a court-house, gaol, theatre, and 8 churches. Population, 10,920. *Petersburg*, 23 miles S. by E. from Richmond, is situated on the south bank of the Appomattox, about 12 miles from its junction with James River at City Point. The Appomattox is navigable for small vessels as far as Petersburg. The town contains a court-house, gaol, and 7 churches. Population, 11,136. *Richmond*, a city, and the capital of the state, in 37° 30′ N. lat., 77° 31′ W. long., is situated on the north bank of James River, at the Lower Falls, and at the head of tide-water. The Falls, or rather Rapids, extend nearly 6 miles up the river, but a canal passes round the Falls, and the river is navigable 200 miles above them. On the opposite bank of the river is the small town of *Manchester*, which is connected with Richmond by a bridge, over which runs the railroad from Richmond to Petersburg. The ground on which the city is built, though generally sloping upward from the river, is broken into several hills of different heights. The plan of the city is regular, the principal streets running parallel to the river, crossed at right angles by others. The chief public building is the State House, or Capitol, which is finely situated in the middle of a lawn, on the brow of a hill which overlooks the city. It is a copy of the Maison Carrée of Nîmes, the plan of which was sent over by Mr. Jefferson when he was ambassador in France. It contains a statue of General Washington by Houdon. The other public buildings are—the City Hall, Governor's House, county court-house, State Penitentiary, Richmond College (72 students), county gaol, theatre, museum, and 23 churches. Vessels drawing 10 feet water come up to Rockets, about a mile below the centre of the city; and those drawing 15 feet to Warwick, 3 miles below the city. The principal articles of export are wheat, flour, and tobacco. There is regular communication with Norfolk, New York, and other places, by steam-boats. Population, 20,153. *Staunton*, 116 miles W.N.W. from Richmond, is situated on Lewis Creek, one of the head branches of the Shenandoah; it contains a court-house, gaol, and 3 churches. Population, 2500. *Wheeling*, a city, 351 miles N.W. from Richmond, is situated on a high bank on the E. side of the Ohio, on a strip of land so narrow as only to allow of three principal streets between the river, with which they are parallel, and the steep hills at the back of the town, so that all further extension must be made at the ends; these three streets are of good breadth, with side-walks well-paved, other streets crossing at right angles. The city contains a handsome court-house, gaol, county-offices, theatre, and 9 churches. It is a place of great thoroughfare, the great National Road passing through it; and numerous steam-boats stop at its wharves. It has manufactures of iron, steam-engines, glass, woollens, cotton, and paper. Bituminous coal is abundant in the vicinity. Population, 7885. *Williamsburg*, 58 miles E.S.E. from Richmond, lies inland between James River and York River. It was formerly the legislative capital of Virginia, but is now a declining town, with about 1600 inhabitants. The only building of importance is the College of William and Mary (110 students). *Winchester*, 146 miles N.N.W. from Richmond, is situated on an affluent of the Potomac. The town is regularly laid out, and contains a court-house, gaol, market-house, and 13 churches. Population, 3504.

History.—The early history of Virginia is the history of the establishment of British colonies in North America. [America.] In 1583 Sir Humphrey Gilbert reached Newfoundland, but died on his passage home. The next expeditions were sent out chiefly through the influence and partly at the expense of Sir Walter Raleigh. In 1584 he obtained a patent, and sent out two small vessels, which reached the coast of Florida, and sailed north as far as the island of Roanoke, in which neighbourhood they remained some time in friendly intercourse with the natives. On their return the country was named Virginia by Queen Elizabeth. In 1585 Sir Richard Grenville sailed with seven vessels, and settled 108 persons on the island of Roanoke, in the present state of North Carolina. They suffered extreme hardships, and must have perished if Sir Francis Drake had not fortunately arrived, and taken them back to England in 1586. Sir Richard Grenville, who had returned to England, sailed again with three vessels, and, not finding the colony, left 50 more settlers. Relief and fresh emigrants were sent out in 1587 under Governor White, who, on reaching Roanoke, found only the bones of one man. He settled 115 more colonists, and returned to England, and in 1590 reached Roanoke again with supplies and recruits, but not one of the 115 settlers was found.

In 1606 James I. granted patents to two companies. To the one, called the London Company, he granted South Virginia; to the other, called the Plymouth Company, he granted New England. On the 19th of December, 1606, an expedition of 105 men in three ships, the largest not more than 100 tons burthen, having entered a river which was then called Powhatan, now the James River, they planted the first colony in the present State of Virginia, May 13, 1607, on a peninsula connected with the north bank, and named the place James Town in honour of King James. Before autumn, fifty men, half the colony, had died, and such was the disunion among the rest, that the whole would probably have perished if the management had not fallen into the hands of Captain John Smith, whose courage and

prudence preserved the little colony from destruction.

John Smith was born in 1579, at Willoughby, in Lincolnshire. The adventures of this extraordinary man, previously to his joining this expedition, in France, in Flanders, in Italy, in the Levant, in Austria, in Russia, in Germany, Spain, and Marocco, are more like a romance than a biography. Afterwards, when compelled to leave Virginia and return to England, he commanded, in 1614 and 1615, two expeditions of trade and discovery to New England. In 1624 he published 'The Generall Historie of Virginia, New England, and the Summer Isles,' folio, London; and in 1630 'The True Travels, Adventures, and Observations of Captain Iohn Smith, in Europe, Asia, Africke, and America, beginning about the yeere 1593 and continued to this present 1629,' with a 'Continuation' of the History of Virginia, London, folio, both of which works were reprinted at Richmond, in Virginia, in 1819, in 2 vols. 8vo. He published also some works on Navigation, and some smaller works on America and other matters. He died in London, in 1631, in his 52nd year, and was buried in St. Sepulchre's Church, Snow Hill.

Smith, on an expedition up the James River and into the interior, in 1607, was taken prisoner by the Indians, and two men who accompanied him were slain. He himself, after being several days in custody, was saved from the tomahawk by the entreaties and interference of Pocahontas, the daughter of Powhatan, the principal chief, and he was ultimately allowed to return to James Town, now reduced to forty settlers. In the following year 70 more emigrants arrived. Smith began to establish friendly relations with the natives, the country was gradually cleared, and under his active superintendence James Town began to assume the appearance of a fortified village.

In 1609 a new charter transferred to the London Company the powers which in the former the king had reserved to himself. Lord Delaware was appointed governor for life, and Sir Thomas Gates, Sir George Somer, and Newport, admiral of the fleet of nine vessels with 500 emigrants, were made commissioners to administer the affairs of the colony till Lord Delaware's arrival. A storm separated the fleet, and only seven ships reached Virginia. The new emigrants were for the most part a dissolute set of impoverished gentlemen and broken tradesmen. Smith however, with much difficulty, maintained his authority over them, till the accidental explosion of a bag of gunpowder inflicted injuries on his person which obliged him to return to England in 1609.

After Smith's departure the colony was soon abandoned to improvidence and idleness; the store of provisions was rapidly consumed; attacks were made by the Indians, stragglers were murdered, and plans laid to destroy the whole colony. Smith had left nearly 500 persons; in six months the number was reduced to 60.

The three commissioners had embarked in the same ship, and this ship was wrecked on the Bermudas. Out of the wreck of their ship and the cedars which they felled they built two vessels, in which they embarked for Virginia, where they arrived only to find a scene of extreme scarcity and distress. The whole body of colonists now resolved to embark for Newfoundland, and disperse themselves among the fishing-vessels, and were sailing down the river when they met the long-boat of Lord Delaware, who had arrived in Chesapeake Bay with supplies and emigrants.

The 10th of June, 1610, was the day of the restoration of the colony to its former seat. Sickness soon obliged Lord Delaware to return; but in the meantime Sir Thomas Dale had been sent out with liberal supplies; and at the end of August, 1611, Sir Thomas Gates landed 300 emigrants from six ships. The colony now amounted to 700 men. Gates was appointed governor, and founded, much farther up the river, a new colony which he called Henrico, in honour of Prince Henry.

From this time the colony advanced in security and prosperity, which were especially promoted by the curious circumstance of a marriage solemnised according to the rites of the Church of England, between John Rolfe, a young Englishman, and Pocahontas, who had more than once saved the life of Smith. The consequence was a confirmed peace with her father Powhatan, which he extended to other Indian tribes under his influence. Pocahontas sailed with her husband to England, and became an object of admiration both at court and in London, which her conduct as a wife and mother afterwards confirmed and continued. Female emigrants were sent out, and in July, 1621, a written constitution was bestowed on the colony, which was founded on the principles of the English constitution; a governor and permanent council were to be appointed by the London Company; and a general assembly was to be convened yearly, which might exercise full legislative power, subject to a negative by the governor and ratification by the Company.

Powhatan had died in 1618, and was succeeded by his younger brother, who was hostile to the English; and in 1622 the Indians prepared to make a secret and simultaneous attack on the whole colony. On the 22nd of March, 1622, at midday and in the same hour, 347 persons, children and women, as well as men, scattered in distant villages extending 140 miles on both sides of the river, were murdered; but the massacre was limited to the distant villages. The night before the attack an Indian had revealed the plot to an Englishman whom he wished to save, and James Town and the nearest settlements were on their guard. The Indians fled from every place where they met with prepared resistance, and assistance was promptly sent from England.

Soon after this a quarrel ensued between King James and the London Company, the result of which was, that in 1624 the patents were cancelled and the Company dissolved. The management of the colony was then entrusted to a governor and counsellors.

On the 18th of April, 1644, another attempt to annihilate the colony by a general massacre was made by the Indians. They killed about 300 on

the frontier settlements, but were soon repulsed, and fled to a distance. The prosperity and population of the colony afterwards advanced rapidly. In 1648 several ships were trading to Virginia, and the number of colonists was about 20,000. Virginia continued to flourish till the American War caused a temporary interruption, and led to a separation of all the North American colonies from Great Britain.

Constitution.—The first state constitution of Virginia was adopted June 29, 1776. The legislature consists of 32 senators, who are elected for 4 years, and 134 representatives, who are elected for one year. The governor is elected for 3 years. Virginia sends 2 senators and 15 representatives to Congress.

VIRGO (Constellation), the sixth constellation in the zodiac, surrounded by Libra, Boötes, Leo, and Corvus. It is best known by two remarkable stars: the first, Spica (α Virginis), a star of the first magnitude, is in the hand, which holds ears of corn, typical of the harvest, which approached in the time of the Greeks as the sun neared this star; the other, Prævindemiatrix, or Vindemiatrix (ε Virginis), took its name from the vintage. the star Spica forms a remarkable triangle with Arcturus and β Leonis (or Denebola); and of the bright stars in this triangle, Vindemiatrix is the one nearest to the line joining Arcturus and β Leonis.

Hesiod and Arátus unite in representing Virgo to be Justice, who retired to Heaven when the golden age came to an end: the former makes her the daughter of Jupiter and Themis; the latter, of Astræus and Aurora: others make her to be Fortune, others Ceres, &c.

VIRIA'THUS, or VIRIA'TUS, the leader of the Lusitanians, in Hispania, in their war with the Romans, about the middle of the second century B.C. When the Roman prætor Servius Galba treacherously massacred a large body of the Lusitanians (B.C. 150), Viriathus was one of the few who escaped. In 149 B.C., a Lusitanian army having been defeated by Caius Vetilius, the fugitives, who were blockaded, were on the point of surrendering, when Viriathus, by a skilful manœuvre, released them, and was appointed their general. In a battle which took place shortly afterwards, he defeated and killed Vetilius. In the three following years he defeated successively three prætors. In B.C. 145 the Romans sent against him the consul Q. Fabius Maximus Æmilianus, who checked his successful course. At last, in B.C. 140, the consul Q. Servilius Cæpio got hold of Viriathus by the treachery of some of that chieftain's friends, and put him to death.

VI'ROLA SEBI'FERA, a large tree of Guyana, which belongs properly to the genus *Myristica*, and is in fact by some called Nutmeg of Cayenne, and has the same properties as many of the other species of that genus. When incisions are made into the bark, a reddish glutinous juice exudes, which, when fresh, is used as a caustic, and which concentrates in time. Within the mace is a kernel of a whitish colour, which, when powdered and put into boiling water, yields a yellowish-coloured fatty substance which swims on the surface. In the country candles are made of it. This vegetable fat or tallow is sometimes met with in commerce in square loaves. It is less fitted for affording light than ordinary tallow, because it melts at a lower temperature.

VIRTUAL VELOCITIES, *The Principle of*, is the name given to a most important generalisation in mechanics, which forms the basis of all the general methods employed in the solution of problems relating to equilibrium. Referring to the article under this head in the 'Penny Cyclopædia,' and to the notes at the end of Poinsot's 'Statique' (8th edition, Paris, 1842), for a full investigation of the subject, we can here only briefly state what the principle is.

By *virtual velocity* is meant the line described by the point of application of a force if the equilibrium of the system to which it is applied receive an infinitely small disturbance. The product of the force (P) into the projection (p) of the virtual velocity upon the line of direction of the force, is called the *moment* of this virtual velocity. Then P, P′, P″, &c., being different forces applied to a system in equilibrium; p, p', p'', &c., the respective projections of their virtual velocities consequent upon an infinitely small disturbance of the equilibrium, the principle of virtual velocities is expressed in the following equation:

$$Pp + P'p' + P''p'' + \&c. = 0.$$

or the sum of the moments of the virtual velocities in such a system, and under such circumstances, is always equal to zero. This principle discovered by Galileo, and developed by John Bernoulli, is made by Lagrange the basis of his 'Mecanique Analytique.' A demonstration of it is given in most modern works on mechanics. It is necessary to observe that the terms *virtual*, *velocity*, and *moment*, used in speaking of this principle, are not applied in their ordinary meanings.

VIS VIVA, a name given in Mechanics to the sum of all the masses of a system, each multiplied by the square of its velocity.

VISCO'NTI, the name of a family in Lombardy, several members of which rose to the rank of sovereign princes during the middle ages. The Visconti, about the middle of the 13th century, belonged to the feudal nobility, and possessed estates near the banks of the Lake of Como and of the Lago Maggiore. In 1262 the archdeacon Ottone Visconti was nominated archbishop of Milan by Pope Urban IV., but owing to the ascendancy gained by the partisans of Martino della Torre, the popular leader, one of whose kinsmen had been appointed to the see by the electors, Ottone was obliged to leave the city; and it was not until 1277, that he overcame his enemies, and was enabled to enter Milan in triumph. He gave up the temporal government to his nephew Matteo Visconti in 1288. The Torriani however continued the struggle, and in 1302 Matteo was forced to leave Milan where Guido della Torre was put in his place, as 'perpetual captain of the people,' and continued in his office till 1311, when his family were exiled. Matteo Visconti then resumed his authority over Milan. Some time after, Matteo obtained possession of Pavia; and Alessandria,

Tortona, Cremona, Bergamo, Lodi and other towns acknowledged in succession the rule of the Visconti. Matteo was opposed by the pope; a number of charges were brought against him; he was condemned, March 14, 1322, as a heretic; and his children and grandchildren were excluded from every honour, dignity, and office. Matteo died three months after the sentence was pronounced against him, and his son, Galeazzo Visconti, was proclaimed lord of Milan. Upon this the pope issued an interdict against the city of Milan, and proclaimed a general crusade against the Visconti family. The aid of Louis of Bavaria and the exertions of Marco Visconti, brother of Galeazzo, saved Milan: but Louis and Galeazzo quarrelled in 1327; Galeazzo was thrown into prison, released after eight months' confinement, and died in exile. His son, Azzo, bought the appointment of imperial vicar of Milan from Louis, and he was the first lord of Milan who struck coin in his own name, omitting that of the reigning emperor. He died in 1339, and his uncles, Luchino and Giovanni, succeeded him. Giovanni was archbishop of Milan and a cardinal, and resigned the government to Luchino, who brought under his dominion the towns of Asti, Bobbio, Parma, Crema, Tortona, Alessandria, and Novara. Luchino died, Jan., 1349, leaving the archbishop Giovanni Visconti lord of Milan, who died in 1354.

His three nephews, Matteo, Galeazzo, and Barnabò, conjointly succeeded him in the lordship of the town of Milan and its territory, but they divided among them the other towns which had become subject to the Visconti. Matteo had for his share the towns south of the Po, namely, Bologna, Parma, Piacenza, and Bobbio, besides Lodi; Barnabò had the towns east of the Adda—Brescia, Bergamo, Crema, and Cremona; and Galeazzo took for himself Pavia, Asti, Alessandria, Tortona, Vercelli, Novara, Vigevano, and Como. In Sept., 1355, Matteo died suddenly, and his brothers divided his share of the territories between them. The city of Bologna however was lost to the Visconti through the treachery of the governor Oleggio, who sold it to the pope's legate, which occasioned a desultory war to be carried on in Lombardy and Romagna for some years, with great cruelty and ferocity. Galeazzo encouraged learning: he opened the university of Pavia about the year 1362, and collected a considerable library. His son Gian Galeazzo married Isabella, daughter of King John of France, and his daughter Violante married Lionel, son of Edward III. of England. Galeazzo died at Pavia in 1378, and was succeeded by his son Gian Galeazzo.

Barnabò continued to rule Milan and the rest of his territories till May, 1385, when Gian Galeazzo surprised Barnabò, and shut him up in the castle of Trezzo, where he died seven months after. In May, 1395, Gian Galeazzo obtained of the Emperor Wenceslas a diploma, creating him Duke of Milan; and by a subsequent imperial diploma, the boundaries of the duchy of Milan were defined, and made to include 25 towns, from Verona, Vicenza, and Belluno on the east, to Alessandria and Tortona on the west. In 1402 Gian Galeazzo was only waiting for the surrender of Florence to declare himself King of Italy, when he died of the plague.

Giovanni Maria Visconti, his eldest son, aged 14, was then proclaimed duke. He proved pusillanimous, suspicious, and cruel. He was murdered, May 16, 1412.

Filippo Maria Visconti, the second son of Gian Galeazzo, was the next duke. He reigned 35 years, dying at Milan in 1447. His son-in-law, Francesco Sforza, succeeded him as Duke of Milan. [Sforza, Francesco.] The dynasty of the Visconti, which may be considered as having commenced with Matteo, in 1288, ended with Filippo Maria, and it constituted one of the most powerful Italian principalities of the middle ages.

VISCONTI, E'NNIO QUIRI'NO, born at Rome in 1751, was the eldest son of Giovanni Batista Visconti, a native of Sarzana, who had succeeded Winckelman as prefect of the antiquities of Rome. Ennio studied the law, and took a doctor's degree in 1771. The pope appointed him to an honorary situation in his household, and made him sub-librarian of the Vatican, whence he was removed in consequence of his refusal to lead a life of celibacy. Prince Sigismondo Chigi soon afterwards appointed Ennio his own librarian. In 1778 the elder Visconti was commissioned to write the text to accompany the series of engravings of the Museum of the Vatican, or 'Museo Pio Clementino.' Giovanni Batista found himself insufficient for the task, and he called his son Ennio to his assistance. The first volume of the series appeared in 1782. In 1784 the elder Visconti died, and his son was then made by the pope Conservator of the Capitoline Museum, his pension was restored to him, and in Jan., 1785, he married. He continued to publish in succession the other volumes of the 'Museo Pio Clementino,' the seventh and last of which appeared in 1807. In the meantime he wrote many other treatises and disquisitions on ancient art. When a republican constitution was proclaimed in Rome, in 1798, he was appointed one of the five consuls of the republic, an office which he held only for a few months; and when the Neapolitan army entered Rome, in Nov., 1799, Visconti was obliged to emigrate to France. Here he was appointed one of the administrators of the Museum of the Louvre, and professor of archæology. In 1804 Napoleon commissioned him to select and publish a series of portraits of distinguished men of Greece and Rome. This was published in two series:—'Iconographie Grecque,' 3 vols. 4to., 1808; and 'Iconographie Romaine,' 1 vol. 4to., 1817. In 1815 Visconti came to London for the purpose of giving his opinion on the merit and the value of the 'Elgin Marbles,' upon which he wrote a memoir after his return to Paris. One of his last labours was his 'Illustrazioni di Monumenti scelti Borghesiani,' Rome, 1821. He died in Feb., 1818. A collection of all his works was begun at Milan in 1818. Labus edited, in 1827, a selection of his minor works in 4 vols. 8vo.

VISCOUNT, the name of a dignity in the English peerage, which is next above that of Baron. [Titles of Honour.]

VISCUM. [MISSELTOE.]

VISEU. [BEYRA.]

VISHN'U (from *vis*' 'to enter' or 'to pervade') occupies the second place in the Trimûrti, or Triad of the Hindoos, and is the personification of the preserving principle. There is no doubt that his worship is of a very ancient date, as there are distinct allusions to him in the Vedas; but at the same time it is evident that it has experienced successive and considerable changes, and that the forms under which Vishn'u is now worshipped in India are far from being authorised by the Vedas.

In the Vedas Vishn'u generally appears only as the younger brother of Indra, the personified firmament, and inferior to him. But it is difficult to determine from the numerous passages in which he is mentioned, which place was assigned to him in the original mythology of the Vedas. There is no trace of Vishn'u, or anything relating to him, in the Institutes of Manu. Yet the two heroic poems, the 'Mahâbhârata' and the 'Râmâyana,' which are generally supposed to belong to the same period of Hindoo literature as the Institutes, have for their subjects two of the latest incarnations of this god. He is said to have appeared before the other celestials, and to have agreed at their humble request to become man for the purpose of destroying the dæmon Râvana, and to remain incarnate among men for 11,000 years, in order to protect the world after saving it. The order of the Avatâras, descents or incarnations of Vishn'u, is not determined. There have been nine Avatâras. The tenth is yet to come.

Vishn'u's Avatâra as Krĭshn'a is probably as ancient as the others, and it has facilitated, as it were, the transition from the elder belief of the Hindoos to that which we find them professing in our days, and serves for the foundation of the worship of deified heroes. Krĭshn'a was a portion of Vishn'u, who had consented to be born of Devakî, the wife of Vasudeva. When the portion of Vishn'u had taken his abode in the womb of a woman, the planetary bodies moved in brilliant order in the heavens, and the seasons were regular and genial; the virtuous experienced new delight, the strong winds were hushed, and the rivers glided tranquilly, when Janârddan'a was about to be born. The surprising adventures of Krĭshn'a are told at great length, and they form the groundwork of the tenets of a particular class of the Vaishn'avas or worshippers of Vishn'u.

There are several annual festivals of Vishn'u in India. Of those in Bengal and Orissa, the Ratha-yâtrâ, or procession of Jagannâtha in his car, is the most celebrated. This festival is rarely held in Upper India, and then only by natives of Bengal.

VISIAPOOR. [BEJAPOOR.]

VISMIA, a genus of plants belonging to the natural order *Hypericaceæ*. *V. Guianensis* is a small tree with a stem about eight feet high. The bark when wounded yields a gum resin, which when dry becomes hard, and resembles gamboge. The leaves and fruit likewise yield a similar secretion.

VISTULA (*Wisla, Weichsel*), the principal river of Poland, rises at the foot of the Carpathians, in the circle of Teschen in Austrian Silesia, and flows first N. to the boundary of Silesia, where turning nearly E., it enters Poland, and passes Cracow. Leaving Cracow it turns N.E., dividing the kingdom of Poland from Galizia as far as Sandomir, where it turns N. to Warsaw, a few miles below which it takes a north-westerly course till it leaves the Polish territory and enters Prussia a little above Thorn. About 20 miles W. from Thorn the river flows in the direction of N.N.E. to the Baltic. Before it reaches the Baltic it divides below Marienwerder, into two branches, the smaller of which, called the Nogat, discharges itself into the Frische-Haff. The larger or western branch, after flowing about 40 miles farther, again divides into two branches, the smaller of which turns E., and empties itself into the Frische-Haff, and the main stream taking the opposite direction enters the Baltic at Weichselmünde, N. of Danzig. The branches that enter the Frische-Haff form several deltoid islands. In its course through Poland the Vistula is joined on the left by the Nida, the Pilica, and the Bzura; on the right by the San, one of the larger affluents of the Vistula, which drains a considerable portion of Galizia, and enters the Vistula near Sandomir; and the Bug, the largest of the tributaries of the Vistula, which also rises in Galizia, and flowing for a considerable distance along the eastern frontier of Poland, turns W., and falls into the Vistula near Warsaw, having received in its course many rivers, among others the Narew, at a short distance from its junction with the Vistula. The whole course of the Vistula is about 550 miles in length: it is navigable for large barges from Cracow. The Bromberg Canal connects the Vistula with the Oder. The Vistula, being connected with so many navigable rivers, is a great channel for the conveyance of the corn and timber of Poland, from the interior of the kingdom to the Baltic ports, especially to that of Danzig. At the junction of the Bug with the Vistula stands the important fortress of Modlin; at Warsaw the river is commanded by Alexander's citadel.

VITA'CEÆ, or VINI'FERÆ, a natural order of plants belonging to Lindley's albuminous group of polypetalous Exogens.

This order includes six genera, which for the most part inhabit the warmer parts of the northern temperate zone, and are found in both the Old and New Worlds. Most of them are natives of Asia, one of Australia, and none in Europe. The most characteristic property of this order is acidity, which is most fully developed in the Grape-Vine. [VITIS.] The acid present is chiefly the tartaric, but malic acid has also been found. In addition to the acid, sugar is present in the fruit, which is of a peculiar kind, and is called Grape-Sugar. Some of the species of *Cissus* are used in medicine. The genus *Ampelopsis* is intermediate between Cissus and Vitis. The species are found in North America, the north of Africa, in China, and the Himalayas. They are all climbing shrubs, of easy propagation and culture, and are very ornamental. The species of the genus *Leea* are large rough shrubs, with cymes of small greenish or yellow

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insignificant flowers. They are not worth cultivating.

VITALINUS. [POPE.]

VITE'LLIUS, AULUS, was of a noble family, of luxurious habits, and fond of the pleasures of the table. He enjoyed the favour of three successive emperors, Caligula, Claudius, and Nero. He was made consul in A.D. 48. After Galba had been elevated to the imperial dignity, in A.D. 68, he ordered Fonteius Capito, the commander of the legions in Germany, to be put to death, and appointed Vitellius in his stead. Galba was unpopular with the soldiers. Vitellius, on the other hand, attached to himself his troops by liberal gifts, and by still more liberal promises; and at the beginning of A.D. 69 he was proclaimed emperor. Soon after the arrival of this news at Rome Galba was assassinated, and Otho was proclaimed emperor (Jan. 15, A.D. 69). Vitellius sent two of his generals to occupy the Pennine Alps and the part of Italy north of the Po (Gallia Transpadana). Otho marched against them, and met the enemy near Bedriacum; but his army being defeated, he put an end to his life about the middle of April. His army recognised Vitellius as emperor, who came to Rome. He had scarcely arrived there when Flavius Vespasianus, who was then engaged in the war against the Jews, assumed the imperial dignity, and was proclaimed emperor on the first of July, at Alexandria, by Tiberius Alexander, the præfect of Egypt. Vespasian was recognised by the legions in Judæa and Syria, and also by those of Mœsia and Pannonia. Antonius Primus, the commander of the latter, marched into Italy without waiting for the commands of Vespasianus. Vitellius was betrayed by his own general, Cæcina; and his army, though superior in numbers to that of the enemy, was routed in an engagement between Bedriacum and Cremona. His camp near Cremona was taken by the enemy, the soldiers surrendered, and Cremona was burnt. While the victorious army advanced towards Rome, Vitellius was dragged from a hiding-place in the palace, and murdered at the age of 57. His body was thrown into the Tiber. This was about the end of December, A.D. 69.

VITEBSK (*Witebsk*), a government of European Russia, which together with Mohilev, fell to Russia at the first partition of Poland in 1772, is bounded N. by Livonia and Pskow, E. by Smolensk, S. by Mohilev and Minsk, and W. by Courland. Its area is 17,145 square miles, and the population in 1846 was 789,500.

The surface presents a vast plain, almost without hills, diversified only by the banks of the rivers, which rise a little above the general level. The soil is sand mixed with clay, and with a very thin covering of vegetable mould. The principal river is the DÜNA, sometimes called Dwina, which forms a great part of the western boundary, and receives numerous small feeders on its right bank. There is a great number of lakes, but not one of any considerable size: the largest is that of Lubahn, on the frontier of Livonia. The abundance of water causes the climate to be damp; but it is temperate and not very variable. Agriculture is the chief occupation of the inhabitants, who cultivate rye, wheat, barley, oats, some pulse, flax, hemp, and hops. Horticulture is pretty well attended to; but there is no cultivated fruit except cherries. The bird-cherry is very common, as well as all sorts of wild berries (bilberries, cranberries, &c.). The immense forests of pine and other timber, afford ample employment to the inhabitants in felling and squaring timber. The pasture-lands are very extensive, and horned cattle and horses are bred in great numbers, but the former are small in size; the horses are partly of the strong Russian race and partly of the light Polish breed. There are large flocks of coarse-woolled sheep; goats, swine, poultry, and bees, are abundant. The lakes and rivers produce various kinds of fish, especially smelts, of which immense quantities are dried and exported. The minerals are iron-ore, freestone, lime, marl, and fullers'-earth. The manufactures are unimportant. The commerce of the government is greatly facilitated by the Düna, and the Berezina Canal, which connects the Düna and the Dnieper. The principal exports are hemp, dried fish, corn, flour, bristles, horses, squared timber, masts, linseed, flax, oxen, wool, hides, tallow, honey, and wax.

Vitebsk, the capital of the government, is situated on the Düna, at its confluence with the Viteba, in 55° 6′ N. lat., 30° 5′ E. long., and has about 17,000 inhabitants. It is surrounded with ancient walls and towers. The part of the town on the left bank of the Düna is the most considerable; beyond the Viteba is the old castle, surrounded with a very lofty rampart, and handsome buildings. The streets are narrow and irregular, and there are only a few stone houses. One of the finest edifices is the Greek convent of St. Basil. There are 14 churches, 8 monasteries, 2 nunneries, many hospitals, poor-houses, orphan asylums, and a large bazaar. Of the four woollen factories in the government, three are in this city; there are also several tanneries. Almost the whole commerce of the government is in the hands of the merchants of Vitepsk: it is chiefly carried on with Riga, Memel, Danzig, and St. Petersburg. *Welisch* (*Wieliz*), a town with 6800 inhabitants, further up the Düna, has a considerable trade in the produce of the country. *Polotzk*, mentioned in the ancient Scandinavian traditions, stands N.W. of Vitebsk, near the right bank of the Düna, and has about 10,000 inhabitants. It is slightly fortified; the citadel has fallen into decay. The handsomest building in the town is the former college of the Jesuits, with a beautiful church.

VITERBO-E-CI'VITAVE'CCHIA, a province of the Papal State, situated between the Tiber, the Comarca di Roma, the sea, and the Grand Duchy of Tuscany. The eastern part of the province lies in the basin of the Tiber; the central part consists of the basin of the lake of Bolsena and its outlet the Marta; and the western part consists of the lower valley of the Fiora, which rises in the Tuscan province of Siena, and enters the sea below Montalto. These three basins or valleys slope southwards towards the Maremma, which extends along the sea-coast. [MAREMME.] The ridge called Cimino, the ancient Ciminus, of volcanic formation, runs from Monte Soriano, N.E.

of Viterbo, which is its highest summit, being 4000 feet above the sea, to Monte Virginio near the lake of Bracciano, and divides the basin of the Tiber from that of the lake of Bolsena. The Cimino is crossed by the high road from Rome to Florence. A succession of lower hills encloses the lake of Bolsena on three sides, leaving an opening to the southward, through which flows the river Marta. [BOLSENA, LAKE of.] On the south-east, between the lake and the Cimino, is a wide plain, at the south-eastern end of which is the town of Viterbo.

The mountains of Cimino and also the other ridges are in general well wooded. The soil in the valleys and plains is fertile but the system of agriculture is bad; nevertheless large quantities of corn, oil, and wine are produced. Cattle are reared in great numbers in the Maremma. Alum is the principal mineral.

Viterbo, the capital of the province and a bishop's see, is pleasantly situated at the northern base of the Monte Cimino, on the high road from Rome to Florence, 40 miles N.W. from Rome, and has about 13,000 inhabitants. It is a large town enclosed by walls and towers; it has a great number of interesting churches, several convents, and other considerable buildings; the streets are well paved, and adorned with handsome fountains. The cathedral is adorned with some good paintings, and with the monuments of several popes. The Episcopal palace annexed to the cathedral is of the thirteenth century; it contains the great hall where the conclave was held, after the death of Nicholas III., A.D. 1281, which terminated in the election of Martin IV. The town hall, begun in the 13th century, has some good paintings, a collection of Etruscan sepulchral monuments, and other antiquities. The old palace of the Farnese family is now a foundling hospital. The population of Viterbo and its neighbourhood are supported chiefly by agriculture; there are however some woollen manufactures. On a conical hill, S.E. of the lake of Bolsena, is *Montefiascone*, a bishop's see, with 5000 inhabitants, chiefly known for the excellent muscat wine which is made in its territory. South of Viterbo, and on the high road to Rome, is *Ronciglione*, built on a bed of lava at the southern base of the Cimino, and on the border of the great plain of the Campagna. It has about 4000 inhabitants, iron and copper works and paper-mills. Near it in a romantic valley, once a crater, is the pretty Lake of Vico, surrounded by thick woods; and the decayed town of *Sutri*, with about 1500 inhabitants, the ancient *Sutrium*, having a large amphitheatre cut in the rock, with six ranks of seats, in very good preservation. East of Ronciglione is *Civitâ Castellana*, a bishop's see, and a town of 2300 inhabitants, in a strong situation, with a regular fortress built by Julius II. The ancient walls of *Falerii* are seen in good preservation at a short distance from Civitâ Castellana. They are made of large volcanic stones without cement, and are above thirty feet high in some parts. South-east of Castellana rises the insulated mountain of Sant' Oreste, the Soracte of the ancients, 2500 feet high, abrupt and naked.

The basin of the lake of Bracciano, which is noticed under BRACCIANO, LAGO DI, partly belongs to the comarca of Rome. West of the lake of Bracciano, on the sea-coast, is CIVITAVECCHIA, the principal port of the Papal state on the Mediterranean. North of Civitavecchia, is *Corneto*, on the river Marta, about two miles distant from the sea. Its high walls, towers, and spires give the town an imposing appearance, but it is deserted during the summer months on account of the malaria. In winter it reckons between 3000 and 4000 inhabitants. Its territory produces abundance of corn, pulse, and hemp, and numerous herds of cattle feed in the wide pasture-grounds. On the coast near Corneto are extensive salt-pans, worked by galley slaves. Near Corneto also are the ruins of Tarquinii, one of the principal towns of ancient Etruria. Near Castro, a ruined town on the Fiora, is the village of Canino, a fief of Lucian Bonaparte, who discovered numerous Etruscan remains in the neighbourhood.

The province of Viterbo-e-Civitavecchia formed part of ancient Etruria. It was comprised in the dominions of the Countess Matilda, who bequeathed it to the see of Rome, and it was then called by the name of 'Patrimonio di San Pietro.' The area of the province is 1456 square miles, and the population amounted in 1843 to 144,988.

VITEX, a genus of plants of the natural family of *Verbenaceæ*. *Vitex agnus castus*, the longest-known species, is a native of the south of Europe. It forms a shrub of about 12 feet in height. The flowers have an agreeable fragrance.

VITIS, a genus of plants, the type of the natural order *Vitaceæ*. The best known of the species of Vitis, and perhaps one of the most extensively cultivated and useful of plants, is the *Vitis vinifera*, the Common Vine or Grape-Vine.

The fruit of the vine is used as an article of diet in several ways. Its agreeable sweet acid flavour when ripe has always rendered it a very desirable food when fresh. The ancients also, there can be little doubt, were in the habit of drinking the expressed juice of the grape before fermentation. Grapes are also dried and used under the name of *Raisins*. The drying is generally effected by cutting half through the fruit-stalk whilst they are suspended on the tree. Grapes thus dried are called Muscatel Raisins, and are principally brought from Spain and the Levant. The most extensive use of the grape is for the purpose of making wine. [WINE.]

With its extensive cultivation, it is not to be wondered at that a great number of varieties should be described. The list from the vineyards of the Continent and from the forcing-houses of England give several hundreds. In most of them the principal difference consists in the form and colour of the fruit, and the shape and clothing of the leaves.

Of the varieties cultivated in hot-houses in Great Britain, catalogues of between two and three hundred have been published. Although our climate does not permit of the grape attaining its greatest perfection in the open air, yet in the forcing system of cultivating grapes by heat, Great Britain probably produces the most delicious grapes in the

world. But even in the open air in the southern counties of England, if proper care is taken, very good fruit may be obtained; and although not so delicious for eating as that produced by forcing, yet in all seasons a very eatable fruit may be obtained, and in warm dry seasons a very delicious one.

Some of the species of Vitis have been introduced into our shrubberries and gardens as ornamental climbers; and for this purpose the following are recommended, by Loudon, in the 'Arboretum Britannicum:'—*V. Labrusca*, the Wild Vine, or Fox Grape. *V. Cordifolia*, Heart-Leaved Vine, or Chicken Grape. *V. riparia*, River-Side or Sweet-Scented Vine, a native of North America, *V. caribæa*, the Carib Vine, a native of Jamaica.

Cultivation of the Grape-Vine.—The grape is exclusively the produce of *Vitis vinifera*. The fruit of several other species of Vitis, natives of America, especially *Vitis vulpina* and *labrusca*, possess some merit as wine-grapes; but they bear no comparison with the long celebrated varieties of the Eastern species, and as dessert fruit they have still less claim to merit. From numerous testimonies there remains no doubt as to the vine being a native of Greece, of Turkey in Asia, and of Persia.

In forcing the vine in this country the directions given by the best authorities, from the result of long experience, agree with the natural condition of the vine in respect to climate. Some variation is necessary according to the season at which the forcing of the vine is commenced, which is sometimes in the depth of winter, and certain varieties require a stronger heat than others. In giving air, the temperature of the house should never be lowered in consequence. The air of the house should be kept moist, except when the fruit is ripening. The syringe may be used for the branches and leaves from the commencement of forcing till the fruit begins to colour, excepting whilst the fruit is in bloom. Recourse should also be had to steaming, and this more especially when the fruit is setting. In every country, except perhaps the hot sandy deserts, the atmosphere is moist at night. This condition should be carefully preserved in a forcing-house, and not interfered with by forcing, whitewashing, &c.

In the formation of the vine-borders, all agree that they should be effectually drained. A good bed of stony materials should then be laid all over previous to the soil being placed upon it.

The soil of which the border is to be composed should consist chiefly of rich fresh or maiden loam (which should be strong yet friable, so as to be at all times pervious to water), a portion of rotten dung, some lime, or other calcareous substance, such as shell-marl, old lime-rubbish, and, by all means, bone-dust, than which nothing is better.

The propagation of vines is easily effected by cuttings, layers, and grafting. Where bottom heat can be commanded, cuttings consisting each of only a single eye are to be preferred. These are at first to be placed in very small pots, and successively shifted into larger as their roots require it. Their leaves should be exposed to plenty of light, and by proper attention the shoots may be grown 20 feet in length in one season.

Grafting the vine requires to be performed at a particular stage of its vegetation. If it be done when the sap is not in motion, as may be proper in other subjects, the wound will *bleed*. The vine to which the scion is to be united must therefore be allowed to be in leaf, and the young shoots several inches in length. Opposite one of these the scion is fitted; and the clay should be covered with moss, and kept moist. When the buds of the scion have begun to expand into leaf, the shoot of the stock opposite to the scion must be stopped, and soon after shortened back to one leaf.

The *Pruning* of the vine should be performed as soon as the wood is perfectly matured in autumn, if early forcing is intended: and in all cases, on walls or elsewhere, the operation should not be delayed later than the beginning of winter. Various methods are adopted in pruning: some cut the shoots almost close to the old wood; others leave it in spurs of the length of several buds, and some cut out a portion of the old wood every year, so as to leave room for a succession of young shoots. The latter mode is technically called the *long cut;* and by adopting it the largest bunches are produced. *Short* or *spur* pruning is chiefly used by fruit-growers for the markets, as the bunches can be had in greater numbers and of a size better suited for the wants of their customers. The vine in fact may be trained in any fashion, provided that the bearing wood is at regular distances, and not anywhere crowded.

No more wood should should be laid in than can have a sufficient share of light for the leaves which such wood produces. As a general principle, nothing can be said in addition to this as regards the chief object of pruning.

The berries should be thinned as soon as they are formed of the size of small peas; and in so doing the interior ones should be cut out. If a small portion of the lower extremity of the bunch be cut off at this period, the part left will have finer and better-swelled berries.

VITO'RIA, the capital of the Basque province of Alava in Spain, is 26 miles S.S.E. from Bilbao, 156 N.N.E. from Madrid on the road to Bayonne, and has about 12,000 inhabitants. It is built on an eminence which overlooks an extensive plain to the north. With some exceptions the streets are regular, well built, and clean. The principal square has stone houses of considerable architectural pretensions, with piazzas, under which are shops and storehouses. The town-hall forms the southern side of the square, and a market is held in the open space. Among the more remarkable buildings are—the Hall of the Biscayan Society; two hospitals; 5 churches; 3 convents; 2 nunneries; and a museum containing a number of Roman antiquities. The manufactures are—leather; candles; reed chairs; household furniture; copper vessels; pottery; table-linen, &c. Trade is carried on in bar and manufactured iron, chocolate, sweetmeats, wool, cloths, silks, shoes, and hats. The French occupied Vitoria from 1808, till they were driven out of it by the British army, June 21, 1813.

VITRÉ. [Ille-et-Vilaine.]

VITRIOL, BLUE. [Copper.]

VITRIOL, GREEN. [Iron.]

VITRIOL, WHITE. [Zinc.]

VITRIOL, OIL OF. [Sulphur.]

VITRU'VIUS PO'LLIO, MARCUS, a Roman architect, well known for his work on architecture, 'De Architecturâ,' in ten books. The history of Vitruvius is known only by what he casually says of himself in his treatise. He is noticed only by two ancient writers: by the elder Pliny, who enumerates him among the writers from whose works he compiled; and by Frontinus, in his treatise on aqueducts, 'De Aquæductibus,' who mentions him as the inventor of the Quinarian measure. Neither the time nor place of his birth is known, but he is generally supposed to have been born at Formiæ (Mola di Gaeta) in Campania, from several inscriptions relating to the Vitruvia family which have been found there. As he dedicated his work to the Emperor Augustus when he was already old, and as it was written before the theatres of Marcellus and Balbus were built, which was in the year 13 B.C. (for when Vitruvius wrote, the theatre of Pompey was the only stone theatre in Rome), it follows that he must have been born about 80 B.C., or a little earlier. From what he says in the prefaces to his third and sixth books, it would seem that he was not very successful in his profession; he executed only one public work that is mentioned, a basilica at Fanum. He was, however, at the time that he wrote, one of the superintendents of the engines of war, the others being Marcus Aurelius, P. Numisius, and Cn. Cornelius. He states that he had received a good education, and was fond of literary and philosophic subjects; that riches were no object with him, and that he was possessed of very little; but that he hoped to acquire a reputation with posterity for the treatise he was then writing. He mentions in the preface to his seventh book the architectural writers to whom he was chiefly indebted for information.

There have been many editions of Vitruvius: the editio princeps was printed, without date or name of printer or place, about 1480, at Rome, by George Herolt, in folio, under the superintendence of Sulpitius. The best edition is that published by Schneider, at Leipzig, in 3 vols. 8vo., 1807, but it is without plates.

There are translations of the work of Vitruvius into French, Spanish, Italian, German, and Dutch. It was translated into English by W. Newton, in 1771-91, with plates, folio, London; by W. Wilkins, R.A., in 1812, 'The Civil Architecture of Vitruvius,' in two parts, 4to., being a translation of the third, fourth, fifth, and sixth books only, but the text is not entire and the introductions are omitted; and in 1826, in royal 8vo., by Joseph Gwilt, London.

VITRY. [Seine.]

VITRY-LE-FRANÇOIS. [Marne.]

VITTÆ, in botany, a term most frequently applied to the receptacles of oil which are found in the fruits of Umbelliferous plants.

It is also sometimes applied to the various stripes which are found upon leaves, and which either arise from irregular distribution or entire deficiency of colouring-matter in the tissues of the leaves of plants.

VIVARAIS, LE, a province in France, formerly included in Languedoc, lies chiefly between the Rhône and the main ridge of the Cévennes from Mont Lozère on the south, to a little north of the town of Annonay. This portion of it now forms the department of Ardèche. The remaining part of Vivarais extended W. of the Cévennes, and now forms the southern part of the department of Haute-Loire. The capital of the province was Viviers. [Ardeche.]

VIVERRA. [Viverridæ.]

VIVE'RRIDÆ, a family of carnivorous mammalia, including the Civets (*Viverra*), the Genets (*Genetta*), the *Paradoxures* (*Paradoxurus*), the *Prionodontidæ*, the *Cryptoproctæ*, and many other forms, such as the Ichneumons (*Herpestes*), the Mangues (*Crossarchus*), and the Suricates (*Ryzæna*).

Destined for a life of rapine, the *Viverridæ* are active and vigorous. In general the body is rather elongated, the head somewhat conical, the muzzle often acute, the eyes oblique, and the tongue rough with retroverted horny papillæ. In most groups the feet are digitigrade, in some semiplantigrade. Many are remarkable for a strongly-scented musky secretion, prepared in certain glandular sacs. Nocturnal or crepuscular in their habits, they emerge from their retreats at the close of day, and then begin their prowl in quest of food. Although of restless, wild, and savage temper, they are by no means destitute of intelligence, and are even capable of being domesticated.

We may notice the following genera:—

1. *Viverra*, the true Civet. Musk pouch consisting of two sub-anal sacs; pupil round; claws semi-retractile.

$$\text{Incisors, } \frac{6}{6}\text{; canines, } \frac{1-1}{1-1}\text{; molars, } \frac{6-6}{6-6} = 40.$$

The true Civets, to which the genus *Viverra* is now restricted, yield in the extent of their carnivorous propensities to the cats alone, which they approach very closely in many points of their zoological character, as well as in their predatory, sanguinary, and nocturnal habits. In addition to the six incisors and two canines which are common to the whole of the true *Carnivora*, they have on each side and in each jaw six molars, one of which is peculiarly adapted for lacerating flesh, while the rest are more or less of the ordinary form. Their tongues are furnished with the same elevated and pointed papillæ which give so remarkable an asperity to those of the cats, and their claws are half retractile. The toes are five in number on each of their feet, and their extremities alone are applied to the ground in walking; the animals are consequently completely digitigrade. But the most distinctive character of the group consists in an opening near the tail, leading into a double cavity of considerable size, furnished with glands and follicles for the secretion of the peculiar odoriferous substance so well known as the produce of the civet, and from which the animal derives its name.

The Civet (*Viverra Civetta*) is a native of North Africa. It approximates to the cat in its habits, and preys upon birds and small quadrupeds.

In a state of captivity it becomes in a degree tame, but never familiar, and is dangerous to handle. The young are fed on farinaceous food, millet-pap for instance, with a little flesh or fish; and, when old, on raw flesh. Many of them are kept in North Africa to obtain the perfume which bears the name of the animal, and brings a high price. The civet is procured by scraping the inside of the pouch with an iron spatula at intervals about twice a week. If the animal is in good condition and a male, especially if he has been irritated, a dram or thereabouts is obtained each time. The quantity collected from the female does not equal that secreted by the male. Civet, like most other articles of this nature, is much adulterated, and it is rare to get it quite pure. The adulteration is effected with suet or oil to make it heavier.

To this genus belong the following species:—the Zibet (*Viverra Zibetha*), the Musang (*Viverra Musanga*), and the Rasse (*Viverra Rasse*), of Sumatra.

2. *Genetta.*—Odoriferous pouches reduced to a slight depression formed by the projection of the glands, and without any perceptible excretion, although the odour is manifest. The pupil has a vertical slit, and the claws are entirely retractile, as in the Cats.

Example, *Genetta vulgaris*, the Common Genet, *Viverra genetta*, Linn. Gray, spotted with small black or brown patches, which are sometimes round and sometimes oblong; the tail, which is as long as the body, is ringed with black and white, the black rings being to the number of nine or eleven. There are white spots on the eyebrow, the cheek, and on each side of the end of the nose.

Cuvier states that this species is found from the south of France to the Cape of Good Hope, and says that it differs in the size and number of the patches, the bands along the shoulder and neck, the lines on the nape, &c.

The Genet loves lowlands, particularly the banks of rivers and the neighbourhood of springs. In Constantinople it is domesticated, and kept in the houses, where it is said to catch mice as well as a cat.

3. *Paradoxurus.*—Generic character generally that of the Civets and Genets. Tail capable of being rolled from above downwards to its base, but not prehensile. Toes five, nearly palmated; sole of the foot tuberculous, applied throughout its surface to the ground; claws semi-retractile. Eyes with the pupil slit longitudinally. No pouch.

Example, *Paradoxurus typus.*—The Paradoxure in form and habits does not differ much from the Genets, and the toes and claws closely agree in number and retractility. The tail is very peculiar; as long as the body and depressed, not to say flattened above and below; the extreme or more distant half is, when extended, turned over, so that the lower side is uppermost, and the animal can roll it up spirally from above, downwards, and from the extremity to the base. The Paradoxure inhabits the large islands of Asia.

4. *Ichneumon.* [ICHNEUMON.]

5. *Ryzæna.*—Feet rather long; toes four armed with robust but not retractile claws proper for burrowing. Tongue furnished with horny papillæ. Ears small. Pouch leading into the anus. Tail long, slender, and pointed.

Example, *Ryzæna Capensis*, the Suricate. This animal is a native of South Africa. It closely resembles the Ichneumon in its habits. Length about four feet.

6. *Crossarchus.*—Muzzle, teeth, pouch, and walk of the suricates; feet as in the ichneumons.

Example, *Crossarchus obscurus*, the Mangue. This animal is a native of Africa, and closely resembles the ichneumons in general habits.

7. *Cryptoprocta.*—Mr. Bennett considers this genus as closely related to the cats, the affinity being indicated both by anatomy and external characters.

Example, *Cryptoprocta ferox.*—Locality, Madagascar. Ferocious, sanguinary, and very active.

8. *Nasua.*—The genus *Nasua* belongs rather to the *Ursidæ* than the *Viverridæ*, and is closely related to that of the raccoons.

The species of this genus, commonly called Coati, or Coati-Mondi, are natives of South America, where they inhabit the woods, feeding on roots, fruits, reptiles, insects, and occasionally birds. They climb with great address, and are sometimes seen congregated in small bands. They are remarkable for the length and mobility of the snout, which projects considerably beyond the lower jaw, and terminates in a sort of disc, where the nostrils open. The eyes are small; the ears rounded; the body long and deep; the toes are five on each foot, armed with powerful claws. Tail long and ringed alternately with dark and pale tints. The canine teeth are remarkable for their size and sharpness, especially those of the upper jaw, which are compressed, aud have a cutting edge both before and behind.

Linnæus placed the Coatis among the *Viverræ*, but they differ in dentition from the true *Viverra*, and have no scent pouch.

In drinking the Coati laps like a dog; but as its long snout would be in the way during this operation, it turns it up so as to prevent its being submerged. Habits greatly but not exclusively nocturnal. In captivity it is savage and capricious; when attacked it defends itself vigorously and utters a shrill cry.

Example, *Nasua fusca*, the Brown Coati, and *Nasua rufa*, the Red Coati. Total length, including the tail, 3 feet 6 inches. Colour subject to variation in its intensity. Both species are common in menageries.

VIVES, JOHN LOUIS, commonly called Ludovicus Vives, was born at Valencia in Spain, in March, 1492. He received his early education in Spain, and went to the university of Paris to study dialectics. He afterwards went to the university of Louvain, where he devoted himself to the study of the ancient languages, and became professor of humanity or the Latin language at Louvain. At Paris he had been

zealous disciple of the scholastic philosophy, but in 1519 he published a book against the schoolmen, entitled 'Liber in Pseudo-Dialecticos.' At Louvain Vives formed an intimate friendship with Erasmus and Budæus. He undertook to edit, for the series of works of the Fathers set on foot by Erasmus, Augustinus' 'De Civitate Dei;' and this edition was published in 1522, and dedicated to Henry VIII., king of England. Henry soon after invited Vives to England, and gave him the charge of the education of the Princess Mary. For the benefit of his royal pupil Vives wrote two little essays on education. He resided chiefly at Oxford, where he read lectures on law and humanity. He lost the favour of Henry by opposing his divorce from Catherine of Aragon, and was thrown into prison. After being released he left England, and settled at Bruges, where he married. He died in 1540. Vives was a very distinguished scholar, who was ranked with Budæus and Erasmus. He did a good deal towards improving the study of classic literature. His works are numerous, and treat of theology, philosophy, and philology.

VIVIA'NI, VINCE'NTIO, a learned mathematician of Italy, who was born of a noble family at Florence, on the 5th of April, 1622; he died in 1703. His numerous mathematical works are well known to antiquaries in that science, but his reputation is not of the popular kind, and any description of them would be here out of place.

VIVIERS. [ARDECHE.]

VIZIAGAPATAM. [CIRCARS.]

VIZI'R, or VEZI'R, is the name of the ministers of the sultan of the Turkish Empire, and is also given as a title of honour to several other high functionaries, civil as well as military. The word is of Arabic origin, and means literally 'the bearer of a burden,' as 'vezr' designates 'the action of bearing or carrying a burden.' The lieutenant of a king was called vizír by the Arabs long before this title was adopted by the Turks-Osmanlis. At first there was only one vizír, but the number was gradually augmented.

VLAARDINGEN. [HOLLAND.]

VLACQ, ADRIAN, a Dutch mathematician of the 17th century, who distinguished himself by his labours in the computation of logarithms. Being a bookseller and printer, he superintended the printing of the tables which he had composed, as well as of almost the first of those which were computed by the mathematicians of this country.

Logarithms had then been recently invented, and while the employment of them was becoming general in Britain through the labours of Briggs, Gunter, and other indefatigable computers, Vlacq, in Holland, contributed greatly to extend their use and a knowledge of the principles of their construction on the Continent. In 1628 he published at Gouda an edition of the 'Arithmetica Logarithmica' of Briggs, which contained the logarithms of numbers between 1 and 20,000, and also between 90,000 and 100,000, to fourteen places of decimals: but, having computed the logarithms of the 70,000 intermediate numbers, he published at the same place, in folio, a French translation of the above work, including in it the 70 chiliads under the title of 'Arithmétique Logarithmétique,' in which all the logarithms are given to ten places of decimals.

Briggs having just before his death completed his great table of logarithmic sines and tangents, his friend Gellibrand wrote for it a preface and an account of the application of the logarithms to the purpose of plane and spherical trigonometry. This work, which was designated 'Trigonometrica Britannica,' was printed at Gouda by Vlacq in 1633. In the same year Vlacq printed a work, composed by himself, which was entitled 'Trigonometria Artificialis, sive Magnus Canon Triangulorum Logarithmicus, ad dena scrupula secunda,' &c.: it contains the logarithmic sines and tangents to ten places of figures, with differences, and to these is added Briggs's table of the first 20,000 logarithms, with their applications, chiefly extracted from the 'Trigonometrica Britannica.'

In 1636 Vlacq published an abridgment of the 'Trigonometria Artificialis,' under the title of 'Tabulæ Sinuum, Tangentium, et Secantium, et Logarithmorum Sinuum, Tangentium, et Numerorum ab 1 ad 10,000,' in 8vo. These tables have passed through many editions in French and German; and, on the Continent, they continued long to be a manual for persons employed in making trigonometrical computations.

VLADIMIR I., Grand-Duke of Russia, surnamed the Great, was the son of Sviatoslav by a slave, or at least a woman of low condition. His father, meditating the conquest of Bulgaria, divided, in 970, his empire between his two legitimate sons Yaropolk and Oleg. Vladimir was made governor of Novgorod, as that unruly place was considered only fit for an illegitimate son.

After Sviatoslav's death, 972, his sons remained at peace for five years, but in 977 Yaropolk, who ruled at Kiev, quarrelled with his younger brother Oleg, and, having slain him in battle, took his share of the paternal heritage. Vladimir, expecting an attack from his brother, fled beyond the sea to the Varingians, *i.e.* the Scandinavians, and returning after two years with a formidable body of adventurers, was joined by the inhabitants of Novgorod. He declared war against his brother, and demanded the hand of Rogneda, daughter of the Varingian Rogvold, prince of Polotsk. Rogneda, who was betrothed to his brother, rejected Vladimir's suit. Vladimir attacked Polotsk; Rogvold was killed with his two sons, and Rogneda was compelled to marry Vladimir.

Vladimir marched on Kiev, and Yaropolk fled from his capital, but being soon afterwards induced to surrender, he was treacherously murdered by his brother's command. Vladimir now became monarch of the empire of his father, which extended from the vicinity of the Baltic to that of the Black Sea. He now established a more regular and efficient system of government; and seems to have conceived the idea of cementing his vast empire by the powerful bond of a religious centre. Accordingly he erected at Kiev the idol of Peran (thunder), the supreme divinity of the Slavonians, and also of the inferior deities to whom human sacrifices were made. But it was not long before the plans of Vladimir were entirely changed. Kiev

had already for more than a century frequent intercourse with Constantinople, where Vladimir's grandmother Olga was baptised in 955. Her example found many imitators, and the trade which was carried on between these two cities had undoubtedly attracted many Greeks to Kiev.

Various motives of ambition now prompted Vladimir to become a convert to the Eastern church. His great object was to effect a matrimonial alliance with the imperial house of Constantinople. In order to ensure success, he began by an attack on the frontiers of the empire; and having besieged the important town of Cherson in the present Crimea, he demanded the hand of the princess Anna, daughter of the Emperor Romanus the Second. He promised, if his request was granted, to receive baptism with all his subjects, and to become an ally of the empire. His demand was granted; he was baptised with his followers at Cherson, and married the Greek princess in 988. He immediately applied himself to the establishment of Christianity in his dominions; all the idols were destroyed by his orders, and the inhabitants were baptised in crowds. He built churches, established schools, and his exertions were greatly facilitated by the circumstance that there was already a Slavonian version of the Scriptures by Cyrillus and Methodius, as well as liturgical works in the same language. An ordinance on the ecclesiastical tribunals, taken from the Greek Nomocanon, was published by Vladimir, and he became so penetrated with the spirit of Christian meekness, that he would no longer punish with death even the greatest criminals, and was content to fine them. This ill-judged lenity produced great disorders, and the clergy themselves were obliged to remonstrate against it, and to induce Vladimir to restore public order by capital punishments. He is said to have entirely amended his habits, which had been grossly licentious, and his charity to the poor was unbounded. After his conversion he had some wars with his neighbours, but they did not produce any consequences.

The end of his life was disturbed by the growing spirit of liberty at Novgorod. The citizens of Novgorod refused to pay the annual tribute sent by that city to Kiev. Vladimir assembled an army in order to coerce his refractory subjects, but he died on his march not far from Kiev, in 1014. His wife Anna died in 1011, as it seems without issue. The Russian church has placed him amongst her saints, and given him a rank equal to that of the apostles.

VLADIMIR MONO'MACHOS, Grand-Duke of Kiev, was born in 1052. He was the son of Vsevolod, the grandson of Vladimir the Great. He made his first campaign under his relative Boleslav the Second, or the Dauntless, king of Poland, in a war against Bohemia in 1076. He afterwards took an active part in the domestic quarrels among the Russian princes, and received from his father, who became grand-duke of Kiev in 1078, the principality of Chernigoff. He also compelled the legitimate prince of Novgorod to cede it to his son, and to content himself with a small principality.

Vsevolod died in 1093, but Vladimir, who wa the real sovereign during the reign of his fathe did not venture to break the law of seniority, an he called to the throne of Kiev his cousin Sviat polk, prince of Turov, the eldest of the famil Sviatopolk died in 1112, when Vladimir becam grand-duke of Kiev, being already sixty yea old. He reigned thirteen years till 1125, and h proved himself during this time a great princ Internal peace was maintained by his authorit and foreign enemies were repelled with succes New towns were built, old ones improved, and th country enjoyed general peace and prosperity.

Vladimir was surnamed Monomachos by h mother, a daughter of the Emperor Constantin IX., Monomachos. His first wife was Gyd daughter of Harold, the last Saxon king of Eng land.

VLADIMIR, a government of European Russi lying between 54° 58′ and 57° 11′ N. lat., 37° 4 and 43° 20′ E. long, is bounded N. by Twe Yaroslaw, and Costroma, E. by Nischnei-Novgoro S. by Riäsan, and W. by Moscow. Its area 18,238 square miles, and the population in 184 was 1,246,500. The face of the country is a undulating plain, diversified by low hills, by th steep banks of the rivers, and extensive forests there are also many heaths and morasses.

The principal river is the Oka, which traverse the south-east of the government. It is joined b the Kliazma, which comes from the government Moscow, crosses this province nearly in the middl and joins the Oka in Nischnei-Novgorod. Bot of these rivers are navigable. Among the num rous lakes, the two largest and most remarkab are the Peganowoe, in which floating islands a sometimes seen; and the Plestschejew about miles long and 4½ broad, and celebrated on accou of the nautical exercises of Peter the Great.

The rivers freeze about the middle of Novembe and thaw in March. The winter is very cold the summer very hot; the spring and autum variable; night-frosts do not cease till May, an return at the end of September. Agriculture the chief occupation of the inhabitants; but th heaths, marshes, sandy tracts, and forests, cover great an extent of surface, that the produce of th harvest is not sufficient for the home consumptio Wheat, rye, barley, oats, millet, peas, garden veg tables, hops, apples, and cherries are cultivated Game, except hares and partridges, is rare; bu bears, wolves, and lynxes, are still met with. Wil berries of various kinds abound. The number horned cattle is merely sufficient for the wants the province; the breed of horses is excellen The minerals are iron, alabaster, potters'-clay, an freestone. The principal manufactures are thos of linen and cotton, leather, iron wares, glass, an crystal. The articles exported are the above-me tioned manufactures, paper, soap, and potashes and also fruit, timber, fire-wood, building-ston millstones, and lime.

Vladimir, the capital, situated in 56° 17′ N lat., 40° 20′ E. long., is built on a group of hil in a fertile plain, on the left bank of the Kliazma and has about 12,000 inhabitants. It is one the oldest cities in Russia, and, from 1157 to 132

was the capital of Great Russia. With the exception of its numerous churches and stone houses, Vladimir has few traces of its former greatness. The city is large, but ill built, and has six gates, terminating the six principal streets. Of the 25 churches, the Cathedrals of St.-Mary and Demetrius are remarkable in the history of Russia. There are two convents, an ecclesiastical seminary, and several government buildings. The town is the see of the bishop of Vladimir and Susdal. The manufactures are cotton, linen, silk, leather, and soap. *Pereslawl-Zaleskoe*, situated at the entrance of the Trubesch into lake Plestschejew, is an old ill-built town, but a large number of churches and convents give it a striking appearance. The population is 4000, who manufacture linen, silks, and woollen cloths, and carry on a profitable transit and commission trade. *Murom*, with 6500 inhabitants, is an ancient town, has 3 convents, 18 stone and 7 wooden churches, and several crown buildings. The inhabitants have some manufactures and considerable trade.

VLIESSINGEN. [Flushing.]

VOCHYA'CEÆ, or VOCHYSIA'CEÆ, a natural order of plants belonging to Lindley's parietose group of Polypetalous Exogens. The species belonging to this order are trees. There are about forty species of this family altogether. They are all natives of equinoctial America, where they are found inhabiting ancient forests, the banks of streams, and sometimes the sides of mountains to a very considerable elevation. None of these trees are remarkable for their beauty or for their uses, but the striking irregularity of the structure of their flowers renders them objects of great interest to the botanist.

VOET, GISBERT, was born at Heusde on the 3rd of March, 1593; he studied at Leyden, and having taken orders, discharged the functions of minister in his native town till 1634. In that year he was appointed professor of theology and Oriental languages in the seminary of Utrecht, which was converted into a university two years later. Voet became the zealous advocate of the doctrines adopted by the Synod of Dort. He attacked vehemently the philosophy of Descartes, whom he designated alternately an atheist and a Jesuit. He was always engaged in controversy, and it seems to have agreed with him, for he lived to the advanced age of 87.

VOET, PAUL, son of Gisbert, was also born at Heusde, on the 7th of June, 1619. He taught, at different times, logic, metaphysics, Greek, and civil law in the university of Utrecht. He published in 1654 a Harmony of the Gospels; and in 1655-57, 'Theologia Naturalis reformata.' Of his juridical works the most valuable, at least that which has carried with it the greatest authority, is the treatise 'De Statutis eorumque Concursu.' His works were the text-books of the young Scotch lawyers, the contemporaries of Stair and Mackenzie, which accounts for their being so often quoted by the ablest Scotch lawyers previous to the commencement of the present century.

VOET, DANIEL, brother of Paul, was born at Heusde on the 31st of December, 1629, and died at Utrecht on the 3rd of October, 1660. He was professor of philosophy at Utrecht. He published several text-books: his 'Meletémeta Philosóphica,' and his 'Physiologica, sive de Rerum Naturâ Libri vi.,' appeared at Amsterdam the year after his death, and were republished, with notes by Vries, in 1668.

VOET, JOHN, the son of Paul, was born at Utrecht on the 3rd of October, 1647. He ultimately became professor of law at Leyden, where he died in September, 1714. His best work is his 'Commentarius ad Pandectas,' Leyden, 1698, 2 vols. folio.

VOGHE'RA, a province of the Sardinian States, division of Alessandria, bounded N. by the Po, E. by Parma and Piacenza, S. by the provinces of Tortona and Bobbio, and W. by the province of Tortona. Its length from E. to W. is about 20 miles, and its breadth is about 15 miles. It lies mostly in the plain of the Po, but the southern part of the province stretches over the northern slope of the Ligurian Apennines, from which the Staffora and other torrents descend and cross the plain to join the Po. The province contains 308 square miles, with a population of 97,162. The country produces much silk. The head town, *Voghera*, has 11,000 inhabitants; it is an uninteresting town; the only building in it worth notice is the collegiate church, which is of good architecture. It is built in a plain on the high road from Turin to Piacenza. *Stradella*, on the high road from Voghera to Piacenza, and near the borders of Parma, has 5000 inhabitants.

VOICE. The voice (from the Latin *vox*) is an audible sound produced in the larynx.

Song-Voice.—The scale of the human voice, from the lowest note of the bass to the highest note of the soprano, within which limits composers write vocal music, is four octaves, viz. from *mi*, E, in the bass clef to *mi*, E^4, in the treble clef. There have been instances, but they are very rare, of voices capable of descending lower, and others of ascending higher than those limits. This scale of sounds is divided into *voce maschile* (male voice), which extends from *mi* (E) in the bass clef to *do* (C^3) in the treble clef; and *voce feminile* (female voice), which extends from *fa* (F^1) to *mi* (E^4) in the treble clef.

The lower or male voice part of the scale is subdivided into Bass and Tenor, each containing two octaves: the Bass extends from *mi* (E) to *fa* (F^2); and the Tenor extends from *do* (C^1) to *do* (C^3).

The upper or female voice part of the scale is subdivided into Contralto and Soprano, each containing two octaves. The Contralto extends from *fa* (F^1) to *fa* (F^3); and the Soprano extends from *do* (C^2) to *mi* (E^4). These are the four scales within which musicians compose vocal music for each class of voice.

Intermediate between the bass and tenor is another male voice, extending from *la* (A) to *fa* (F^2), and termed the Barytone. And between the Contralto and the Soprano is another female voice, extending from *la* (A^1) to *la* (A^3), and termed the Mezzo-Soprano. The voices of eunuchs and boys are classed with female voices.

It is thus obvious that the scales of the several

voices overlap each other in the great compass of the human voice. Thus the bass overlaps the tenor eleven notes, so that the tenor descends to within five notes as low as the bass; while the bass ascends to within four notes as high as the tenor. Eleven notes are common to both bass and tenor scales, and any music whose variations of pitch are within the range of those eleven notes can be sung either by a tenor or a bass voice. A tenor voice reaches to within three notes as high as the contralto compass, and midway up the soprano, giving twelve notes common to the tenor and contralto scales, and eight notes common to the tenor and soprano scales, which explains the wide range of music which tenor voices can sing.

The ordinary compass of a voice is about twelve notes. Many singers' voices however extend to two octaves; some even beyond two, and some have reached three octaves. Catalani's compass is said to have been three and a half octaves.

The compass of soprano and some other voices are divided into registers, of which there are two viz. the natural and the falsetto. The former is termed in the Italian school *Voce di Petto,* which means chest voice; and the latter *Voce di Testa,* which means head voice. To these the Italians add another which joins the two registers, and which somewhat partakes of the character of both; it is named the *mezzo falso,* or middle falsetto. Each person's voice has a distinct quality or tone (*timbre* of French authors), by which it is recognised, even when singing in unison with others.

The song note is a musical sound of some fixed pitch in the musical scale. When a clear resonant voice produces a song-note, the accompanying harmonic sound may be heard just as it is with the sound of a vibrating string.

Speech-Voice.—The speech-note is not a true musical sound, because its pitch varies throughout its duration. These notes are termed slides, accents, and inflections; and they may be imitated on the violin by sliding a finger up the finger-board while the bow is applied. These notes may have an ascending or descending course in pitch, and sometimes they have both on a syllable. The varying pitch of a speech-note will be illustrated if the reader, with an intense feeling of inquiry, utter aloud Hamlet's interrogatory, 'Pale, or red?' The speech-note on the word 'pale' will consist of an upward movement of the voice; while that on 'red' will be a downward movement, and in both words the voice will traverse so wide an interval of pitch as to be conspicuous to ordinary ears; while the cultivated perception of the musician will detect the voice moving through a less interval of pitch while he is uttering the word 'or' of the same sentence. And he who can record in musical notation the sounds which he hears will perceive the musical interval traversed in these vocal movements, and the place also of these speech-notes on the musical staff.

Several of the rhetoricians of antiquity speak of the changes of pitch of the voice seldom exceeding a fifth on any one syllable. This is true, though higher intervals are used, even up to the octave, but very sparingly, and the fifth itself is of less common occurrence in oratory than the third.

Speech melodies seldom exceed the limits of an octave and a half. Whatever the speaker's key note may be, he seldom rises more than a fifth above it, or descends more than a fifth below it in pitch. A person's key note is generally somewhat below the middle of his compass; which circumstance enables most speakers to ascend an octave if required for the purpose of expression.

VOIRON. [Ise'RE.]

VOITURE, VINCENT, was born at Amiens in 1598. His father was a wine-merchant, but an attendant upon the court, and known to all the principal people there. Voiture himself was educated at Paris. Two poems by him, one in Latin and the other in French, on the assassination of Henry IV., were published in a collection of pieces by members of the college of Calvi, in 1612; the same year appeared his 'Hymnus Virginis, seu Astreæ;' and it was at the college de Boncour that he made the acquaintance of M. d'Avaux, who afterwards, when he became superintendent of the finances, gave his friend the valuable place of one of his first clerks. He soon became distinguished at court; and he spent the rest of his life in the society of the great, occasionally visiting foreign countries on some court mission. Among the places he enjoyed were those of maître d'hôtel to the King, and introducteur des ambassadeurs to the Duke of Orléans. He was elected a member of the French Academy in 1634, and of that of the Umoristi at Rome in 1638. He died in 1648.

With the exception of his early pieces, and some stanzas addressed to Gaston of Orleans in 1614, Voiture printed nothing in his lifetime; but his French writings were collected after his death, and published at Paris in 1650; and they have since been often reprinted. They consist of letters, poems, and a portion of a prose romance entitled 'L'Histoire d'Acidalis et de Zelide.' His Latin verses were first added in an edition of his works published at Paris, in 2 vols. 12mo., in 1729. He is also said to have written easily and correctly in the Italian language, as well as in French and Spanish. There are at least two English translations of Voiture's 'Letters,' which appeared in 1657 and 1736.

VOLCA'NO. The situations on the globe where subterranean fires have made or found channels to the surface of the land or to the bed of the sea, are termed volcanoes.

Volcanic action is a local consequence of earthquakes, which are themselves the effect of a disturbance of the conditions of equilibrium among the masses which compose the globe for some depth from its surface. [Earthquakes.]

When by some movement of the ground a channel is opened from the interior to the surface of the earth, volcanic action follows, and an eruption takes place through the new opening. There may be a slow outpouring of melted rock, pressed upwards against gravity by some internal force (as steam); or a violent upburst of clouds of scoriæ and ashes, mixed with larger stones; or a torrent of the same materials mixed with water,

and constituting mud; or volumes of steam and gases of different sorts. In the space of 48 hours, in 1538, the Monte Nuovo, 440 feet high and 8000 feet in circumference, was thrown up in a place which may be regarded as a new vent of the Neapolitan volcanic region; in 1759 a new vent was opened west of Mexico, a new mountain (Jorullo) was thrown up to the height of 1695 feet, and an area of three or four miles was swelled up like a bladder. Between July and August, in 1831, the island of Sciacca had been raised from the sea-bed, 100 fathoms deep, to a height of 107 feet above the sea, with a circumference of 3240 feet; in September its height was 100 to 230 feet, and its circumference 2300; in the winter of 1831–2 the whole vast heap of ashes had been dispersed by the waves, and nothing now remains of this short-lived volcano but a dangerous shoal. The lava currents from many volcanoes are of the same gigantic proportions. In 1794 Vesuvius poured forth 46,098,766 cubic feet, and Ætna, in 1669, 93,838,950 cubic feet. The accumulated effects of two years' eruptions of Skáptaa Jokul in Iceland, appear to have filled valleys and lakes and broad plains with floods of melted rock. The lava is said to have flowed in one direction 50 miles, and in another 40 miles, with breadths of 15 and 7 miles respectively, and with a depth averaging about 100 feet, but in places reaching 600 feet.

Steam-power, generated by the admission of water to the hot interior parts of the earth, appears adequate to the eruptive forces actually witnessed in volcanoes. It is much in favour of this being really the agency employed, that we find in explosive eruptions such considerable bodies of aqueous vapour discharged during most parts of the paroxysm. Some eruptions indeed have yielded little else than steam, and others chiefly hot water.

The substances thrown out during volcanic eruptions, whether stony, liquid, or gaseous, disclose more or less completely the nature and condition of the interior masses of the globe. Various minerals, metals, and metallic oxides compose the solid portion. Lavas which remain and grow solid under great pressure about the internal base of the volcano are of a more dense nature than those which come to the surface. The liquid products of volcanoes are chiefly water; but they also include muriatic, sulphuric, and boracic acids. The gaseous products, besides steam, include chlorine, nitrogen, sulphuretted hydrogen, sulphurous acid, and carbonic acid.

VOLGA, THE, is the longest river, and, with the exception of the Danube, has the largest volume of water of any river in Europe; its entire course, which exceeds 2000 miles in length, is within the Russian Empire. It rises near 57° N. lat. 27° 40 E. long., on the frontier of the governments of Twer and Novgorod, in a small lake formed by several springs, and it flows through the lakes of Oselok, Plara, and Volga, which it quits about 90 miles above Twer. Near Ostuschkof it receives the Selicharowka, issuing from Lake Seeliger, and attains the breadth of 150 feet; at Rshew-Vladimirow it becomes navigable for small boats, and at Twer, where it is 700 feet broad, for large barges. Having traversed the government of Twer in an easterly direction, it turns N.E. to Yaroslaw, then S.E. to Kostroma and to Nischnei-Novgorod, where it receives the Oka; thence to Casan, where, having been joined by the Kama, it becomes 1000 yards broad, turns nearly S., and having passed Simbirsk, Saratow, and Astrachan, it divides into eight branches, which enclose 70 islands, and discharges itself by 65 mouths into the Caspian Sea, to which it is computed to bring 1,000,000,000 cubic feet of water in an hour. The rivers which join it, with the exception of the Oka, before it reaches Casan, are of no great magnitude; but the Kama, which joins it at Casan, after a course of 1000 miles, makes a vast accession to its waters. By a judicious system of canals, connecting the Düna with the Kama and the Volga, the Polar Sea communicates with the Caspian by a navigation of 4000 miles. The Volga is connected also by canals with the Lake of Ladoga, the Neva, and the Baltic. The banks of the Volga are extremely fertile; and there is no other part of Russia where so much oak timber grows as in the vicinity of this river. The navigation of the Volga is much obstructed, in the dry season of the year, by shallows and islands, and the volume of its waters is gradually but certainly diminishing; in May and June however the melting of the snow swells its waters, and often causes extensive inundations. At this season its depth is so increased that large ships descend it in safety from Twer to Astrachan. In winter the river is frozen to a great depth; the navigation is open only about 200 days in the year. The Volga is more abundant in fish than perhaps any other river in the world; many thousand small vessels are employed in the fisheries. The fish taken in the largest quantities are sturgeon, carp, and pike of extraordinary size. Seals also come from the Caspian into the mouths of the Volga, where they are taken.

VOLHYNIA (*Wolynsk*), a government of West Russia, formerly included in Poland, lies between 49° 40′ and 52° N. lat., 23° 40′ and 29° 24′ E. long., and is bounded N. by Grodno and Minsk, E. by Kiew, S. by Podolia, and W. by Galizia and Poland. Its area is 27,434 square miles, and the population in 1846 was 1,445,500.

The surface presents an inclined plane sloping from S. to N., with a few undulations, none of which are more than 300 feet above the sea. The south and south-western districts are traversed by low ranges connected by a tableland about 1000 feet high, with the Carpathian Mountains. With the exception of a small portion along the north-western boundary, which is drained by the Bug, a feeder of the Vistula, the whole government belongs to the basin of the Pripets, one of the largest tributaries of the Dnieper, which rises near Vladimir, flows N.N.E. into the great marshes of Pinsk, whence it runs first E., then S.E., through the governments of Minsk and Kiew into the Dnieper on the right bank. The principal feeders of the Pripets on the right bank in this province are—the

Stokhod, the Styr, the Gorin (which receives on its right bank the large river Sloutch), the Oubort, and the Ouj. The Teterev, a direct feeder of the Dnieper, drains the south-eastern districts. The Bog rises just within the southern boundary. On the northern frontier there are extensive peat moors and morasses; and where there are hills, whether in the north or south, they are clothed with forests of pine, oak, beech, and lime. There are several mineral-springs. The climate resembles that of southern Germany, only the winter is rather more severe, and the rivers are every year frozen. There are no prevalent endemics except the *Plica Polonica;* a murrain often prevails among the cattle, and swarms of locusts periodically desolate extensive tracts.

Volhynia is one of the most fertile provinces of Russia. The rich crops of grain are to be attributed to the fertile soil however, rather than to the farming, which is rude and slovenly. In the northern border the pastures are so luxuriant as almost to hide the sheep and goats that feed in them. Besides rye, barley of several kinds, oats, and millet, the farmers cultivate several species of wheat of the finest quality, and have a large annual surplus for exportation. Flax and hemp are grown in great abundance; rapeseed, tobacco, and pulse also, but only for home consumption: linseed, hempseed, and oil are exported. In some parts mustard, saffron, and capsicum are grown; hops and common fruits are generally cultivated. Great quantities of timber and fire-wood are conveyed to the Dnieper, partly by rafts, partly by land-carriage; the forests also furnish much pitch, tar, charcoal, and potash. The wild animals are stags, elks, fallow-deer, wild boars, polecats, beavers, otters; a few bears, lynxes, and wild cats; and many wolves and foxes. The Volhynian oxen are fine animals, and great numbers are exported. The horse is larger and stronger than the other Polish horses. The sheep are of inferior breed. The farmer has fewer goats than swine, and great numbers of bees, whose honey is celebrated for its good quality. Bog-iron, saltpetre, building and mill-stone, potters' and porcelain clay, and limestone, are found.

Manufactures are greatly on the increase; the number of factories is nearly 300; the chief industrial products are linen, leather, woollen-cloths, hosiery, earthenware, porcelain, and paper. The surplus agricultural and industrial produce is sent down the Dnieper. Live stock, honey, and wax, find a ready market in Austria and Poland, whither they are conveyed by the Jews, who have the whole trade of the province in their hands. *Schitomir*, or *Zitomierz*, the capital of the government, situated on the Teterev, has a population of about 12,000, who have a considerable trade in woollen cloths, linen, silks, calicoes, leather, wax, honey, and wine. *Berdykziew*, an ugly ill-built place, 25 miles S. from Schitomir, is the largest and most commercial town in the country; it has several churches, a large fortified Carmelite convent, and a population between 30,000 and 40,000, of whom a great proportion are Jews. *Dubno*, an ill-built town in a very fertile district on the left bank of the Ikva, feeder of the Stry, is famous for its great fair and contains several churches, a castle, a monastery, and about 7000 inhabitants, who trade extensively in cattle, timber, and agricultural produce. *Zaslau*, or *Iziaslav*, a town on the Gorin with 5000 inhabitants, has 5 churches, a monastery, and a synagogue. The inhabitants have six annual fairs, and a brisk trade in the produce and manufactures of the country. *Ostrog*, on the Welija, a feeder of the Gorin, contains an ancient castle, several churches, a large Basilian convent and school, and about 6000 inhabitants, who carry on a considerable trade; the annual fairs are well attended. *Kremenetz* (*Krzemieniec*) situated at the foot of a high mountain, on which there is a castle, has several churches, a monastery, a gymnasium, and 8000 inhabitants.

VOLKAME'RIA, a genus of the natural family of *Verbenaceæ*. To this genus a great number of Asiatic plants have been referred by different botanists, but these are now considered to be strictly species of *Clerodendron*. The genus now contains only a single West Indian species, *V. aculeata*, which is one of the most common plants in the low lands of Jamaica, in a dry gravelly soil, as well as in most of the other islands, growing to the height of 5 or 6 feet.

VOLNEY, CONSTANTIN-FRANÇOIS CHASSEBŒUF, COMTE DE, was born Feb. 3, 1757, at Craon in Anjou, where his father was an advocate. He was educated at the colleges of Ancenis and Angers. He went to Paris in his 17th year, in order to study the law, which however he exchanged for medicine; and eventually on succeeding to an income which rendered him independent, he gave up the thought of following any profession. In 1783 he set out for the East, and on his return to France in 1787 he published, in 2 vols. 8vo., his 'Voyage en Syrie et en Egypte pendant les Années 1783, 84, et 85.' He had during his absence devoted eight months to the study of the Arabic language. He was elected deputy of the tiers état to the National Assembly; he was also a member of the Constituent Assembly, and afterwards of the Convention. Volney acted generally with the party of the Girondists, till the establishment of the reign of terror in 1793, when he began to think that matters had been carried too far, and he ceased to support them. In Sept., 1791, he presented to the National Assembly his 'Ruines, ou Méditations sur les Révolutions des Empires;' the work in which he first announced his views as to the symbolical character of Christianity and of other religions. Soon afterwards Volney retired to Corsica in order to cultivate a property which he had purchased there; but the insurrection headed by Paoli compelled him to leave the island in the spring of 1793. Volney was afterwards sent to prison by Robespierre as a royalist, and remained in confinement for about ten months; he regained his liberty on the overthrow of Robespierre, and soon afterwards he was appointed professor of history in the newly-established École Normale, where for about a year he delighted crowded audiences by his lectures

In 1795 he drew up a series of 'Questions de Statistique à l'Usage des Voyageurs,' which were reprinted in 1813. This year also he published a tract entitled 'Simplification des Langues Orientales, ou Méthode nouvelle et facile d'apprendre les Langues Arabe, Persane, et Turke, avec des Caractères Européens.' His notions upon this subject were opposed by Langlés, Silvestre de Sacy, and other Orientalists; but he never himself relinquished them. The Asiatic Society at Calcutta in 1798 elected him one of its honorary members.

The École Normale was suppressed in 1795; upon which Volney proceeded to the United States of America; but he returned to France in the spring of 1798. Volney and Bonaparte had become acquainted in Corsica; and Volney is supposed to have had, soon after his return from America, a share in the contrivance and preparation of the revolution which placed Bonaparte at the head of affairs. Volney subsequently joined the small minority of the body which Napoleon contemptuously called the 'idéologues,' 'hommes speculatifs,' and other such names. He however somewhat later accepted the titles of comte and commandant of the Legion of Honour. In 1803 he published, in 2 vols. 8vo., his 'Tableau du Climat et du Sol des États-Unis d'Amérique.' His next work was a 'Rapport fait à l'Académie Celtique sur l'Ouvrage Russe de M. le Professeur Pallas, Vocabulaires comparés des Langues de toute la Terre,' which appeared in 1805. In 1808 he published a 'Supplément à l'Hérodote de Larcher.' That and his 'Chronologie d'Hérodote,' which he published the following year, involved him in a controversy with Larcher. Volney was one of the senators who voted in favour of the decree passed April 2, 1814, for the deposition of Bonaparte; and on June 4 he was elevated to the peerage by Louis XVIII. He afterwards published two or three other works on the Asiatic languages and on the Hebrew. He died April 23, 1820. He had also published various tracts of more or less importance, and was a contributor anonymously to the 'Moniteur' and the 'Revue Encyclopédique.'

VOLOGDA, a government of European Russia, extending from 58° 30′ to 64° 40′ N. lat., and from 38° 20′ to 59° 40′ E. long., is bounded N. by Archangel, E. by Tobolsk and Perm, S. by Viatka, Costroma, and Yaroslaw, W. by Novgorod and Olonetz. The area is 147,422 square miles, and the population in 1846 was 822,200.

The surface of this government is an immense plain, which extends eastwards to the Ural Mountains, and is traversed by a lateral branch of that chain, which crosses the north-eastern part, and forms the watershed between the Petschora and the Dwina: it contains vast forests, extensive morasses, and some lakes. The soil is very various; presenting clay, marl, much peat, and extensive sandy heaths; but there are large tracts in which the surface is covered with a rich mould. The most fertile part is the south-west. The principal rivers are—The Dwina; the Vaga, which is navigable for small vessels, and joins the Dwina in the government of Archangel; and the Petschora, which rises in the Ural Mountains, is from 14 to 20 feet deep, and is navigable throughout the summer. The North Catherine Canal, uniting two rivers, both called Keltma, the one a tributary of the Wytschegda (a feeder of the Dwina), and the other a tributary of the Kama (a feeder of the Volga), and completing the junction between the Frozen Ocean and the Caspian, is in this province.

The most considerable lakes are:—The *Kubenskoe*, which receives the Kubana and twenty other small rivers, and from which one branch of the Suchona issues; the island of *Kamennoi* is in this lake: the two lakes called *Piätisorskoi*, which are very deep: Lake *Sandor*, 10 miles long and 3 broad: and Lake *Kondas*. Some of the morasses in this government are 25 to 45 miles in circumference.

The Climate is very cold, but salubrious: it however varies considerably in different parts of the province. The rivers freeze about the middle of November, and thaw in May. In summer there are many foggy, rainy days, and often night-frosts. The autumn is frequently serene and bright. In August the leaves fall from the trees, and the birds of passage take their departure.

Agriculture requires the utmost care, and the ground must be well manured. The bread-stuffs grown are rye, barley, and oats. Flax, hemp, some hops, peas, and beans, are cultivated. In the south-western circles only, the produce is sufficient for the home consumption. In the north-east, only cabbages, turnips, and garlic thrive; in the south-west the gardens produce most of the vegetables common in Russia, and also apples and cherries. The immense forests constitute the wealth of the province. The chase of wild fur-bearing animals furnishes many valuable articles both for the inland and foreign trade. Horses, oxen, sheep, goats, and swine are numerous. Fish are scarce.

Iron, copper, granite, freestone, quartz, felspar, whetstones, limestone, and salt, are found. The salt-springs are very important.

There are manufactories of woollen cloth, linen, glass, iron-ware, and paper; also brandy distilleries, tanneries, and manufactories of candles, which are highly esteemed all over Russia. Vologda lying between Archangel and Siberia, has a very important trade, which is carried on in summer on the rivers, and in winter by means of sledges. The principal trading towns are Vologda, Totma, and Ustiug. The several annual fairs are very well attended.

Vologda, the seat of government, situated in 59° 12′ N. lat., 40° 10′ E. long., on the river Vologda, is an open town, consisting of two principal parts, each of which is divided into four quarters. The public buildings are—51 churches, a gymnasium, and many buildings and magazines belonging to the crown. The inhabitants, 14,000 in number, manufacture linen, silks, leather, sealing-wax, white-lead, colours, vitriol, and have very extensive tanneries and candle manufactories; they likewise make very superior articles in gold, silver, enamel, and lacquered ware. The merchants trade with St. Petersburg and Archangel,

to which they send hemp, tallow, Russia leather, linen, candles, linseed, bristles, salted and frozen fish. *Totma*, on the Suchona, has 17 churches, 3 convents, several magazines, and 3000 inhabitants, who have considerable commerce with Archangel and Siberia. The salt-works produce annually from 30,000 to 40,000 poods (36 lbs.) of salt. USTIUG-VELLIKI has been already described.

VOLPA'TO, GIOVA'NNI, was born at Bassano, in 1738. Having adopted engraving as a profession, he fixed himself in Venice, where he became the pupil of Bartolozzi. Volpato engraved many good prints after Venetian masters, but his best works were from Raphael and other masters at Rome, where he finally settled. His prints are numerous considering their scale and the style in which they are executed. He and his son-in-law Morghen were the best engravers in Italy at the end of the 18th century. Volpato died at Rome in 1803.

VOLPI, GIAN ANTONIO, born at Padua in 1686, studied in his native town, and became a good Latin and Greek scholar. In 1717 he and his brother Gaetano Volpi established a printing-press in their house for the purpose of bringing out correct editions of classic authors, and they engaged for their assistant the printer Giuseppe Comino. This press—known by the name of Volpi-Cominiana, produced among others a valuable edition of Catullus, of which the title is, 'Caius Catullus Veronensis et in eum Jo. Antonii Vulpii novus Commentarius,' 4to., Padua, 1737. Volpi was for many years professor of philosophy and of rhetoric in the university of Padua. In his old age he became blind, and died in 1766. Gaetano Volpi edited Sallust in 1722, and was an active assistant to his brother. He wrote an account of their joint labours: 'La Libreria dei Volpi e la Stamperia Cominiana.' Giuseppe Comino having died in 1752, his son Angelo Comino continued to carry on the business. Another brother of Volpi, named Giuseppe, undertook the continuation of Cardinal Corradini's great work, 'Vetus Latium profanum,' which he completed.

VOLTA, ALESSANDRO, was born at Como, in 1745, of a noble family, and was educated in that city; in 1774 he was appointed professor of natural philosophy in the university of Pavia; and while he held that chair he made the discoveries which have immortalised his name. In 1777 he made an excursion into Switzerland, and in subsequent years visited most of the countries of Europe. In 1804 Volta was allowed to resign his professorship; and, giving up his studies, he spent the rest of his life at his native town, Como. Here he was seized with a fever, which, after an illness of only two days, terminated fatally March 5, 1826.

In 1775, while pursuing some experiments on the non-conducting property of wood when impregnated with oil, he was led to the construction of his 'electrophorus,' an instrument which beautifully illustrates some of the laws of electricity; and during these investigations he was further led to the discovery of the instrument which he designated an Electrical Condenser. In 1777 he invented the elegant apparatus which i called the Hydrogen Lamp. About the same tim he discovered a process for determining the pro portions between the two gases, oxygen and nitro gen, which constitute atmospheric air; and h also invented the instrument which has bee called the Electrical Pistol.

But the discovery by which the name of Volt is chiefly distinguished is that of the developmen of electricity in metallic bodies. Under GALVAN is explained the electrical action in the nerves o animals; but Volta was the first to show that th principle of excitation existed in the metals, an not in the nerves of the animal. He wrote tw papers, in which he communicated his views an experiments to the Royal Society. Repeated ex periments led him at length to the invention o what is designated an *Electrical Battery*—an ap paratus which has since, under its various modif cations, produced such important results. B the faculty of skilfully combining experiment and a profound sagacity in perceiving the conse quences which might be deduced from them Volta was enabled to make many important di coveries; but it is remarkable that he often hel unfounded opinions of the causes of the ph nomena, and he does not appear to have pursue any of his researches so far as to arrive at math matical precision in his results.

A collection of the works of Volta, dedicated t Ferdinand III., grand-duke of Tuscany, was pul lished, in 1816, at Florence, under the titl 'Collezione delle Opere,' &c., in 5 vols. 8vo.

VOLTAGRAPHY, or ELECTROGRAPHY If the wire connected with the zinc element of compound battery have a surface of any conduc ing substance attached to it, moulded into an form, or having any design or pattern cut upon it while the other wire terminates in a copper pla of equal surface with the former, both being place near and parallel to each other, but not in contac and be immersed in a saturated solution of su phate of copper; this solution will undergo de composition, and the metallic copper will be slowl and equally deposited on the plate, and will for an exact counterpart or *cast* of the form or pa tern. This is *Voltagraphy*, or *Electrography*, *Electro-Deposit*.

Let the object to be copied be a small bas-reli of about six inches by four, executed in a materi such as marble, ivory, or plaster of Paris. wax mould is made from the bas-relief; and th wax is made a conductor of electricity by bein brushed over with powdered plumbago. Th mould and a plate of copper are placed paralle in a convenient vessel containing a solution sulphate of copper. The copper plate must hav a wire soldered to its upper edge, for the purpo of connecting it with that of the battery; an the wax mould must be similarly connected wit the zinc element of the battery. The mould an the copper plate being thus placed in the met and connected by wires with the battery, an the solution being poured in, the whole is le undisturbed from 24 to 36 hours; at the end which time, the mould, being detached from th battery and withdrawn, will be found covere

over with pure bright metallic copper, rough on the outer surface; but when separated from the wax by gently heating, it will, if the operation has been successful, present a perfect copy of the bas-relief, every line of which, to the most delicate markings, will be found transferred to the metal with more precision and delicacy than could have been produced by a cast made with the copper in a state of fusion. Perhaps few facts connected with the laws of aggregation of homogeneous matter are more striking than this, and few facts indirectly afford a more remarkable instance of the chemical divisibility of matter.

The copying of coins, medals, seals, and plaster casts, is extensively practised by the process above described. The production of copper busts, made entirely by deposition from solution, is also an example of the application of this process. Stiglmayer, the sculptor, devised a mode of coating colossal plaster statues with copper by the electro-process in the short space of two or three hours. Daguerreotype pictures are capable of being copied in electrotype, by a kind of etching by galvanism; and Mr. Smee has suggested the employment of a plan somewhat similar for etching in general.

The terms *Electrotint* and *Glyphography* have been applied to two methods of etching by galvanism, in which the device is produced in rather a peculiar way. The methods are adapted, one for plate-printing, in which the design is in intaglio; and the other for surface printing, as in common typography. Both have been partially brought into use, but not to any considerable extent.

A most curious instance of the extensive applicability of the art of voltagraphy is the fact of calico having been printed by means of it. The linen, steeped in proper liquids, is made to pass between rollers, one of which has patterns formed in it of different metals inserted into its substance, and connected with the zinc of a battery: the other roller is a simple metallic conductor: the current between these surfaces produces different colours by the difference in their action on the common fluid, and thus the pattern is imparted to the calico.

The voltagraphic process has been recommended not only for copying engravings, but for making the copper-plate itself on which an engraving is to be executed. The copper-plates prepared for engravers generally contain a small portion of other metals, which render both the engraving and the etching somewhat uncertain. By the substitution, therefore, of plates produced by electro-deposition, in which the copper is quite uncontaminated with other metals, an advantage is anticipated. To produce these plates, a copper-plate is prepared in the usual way and suspended in a copper solution, by which a film of any desired thickness may be produced; and by a previous adjustment of the plate, the new portion may be separated from the old in the form of a distinct plate, susceptible of after-preparation for the engraver. Or, the copper-plate, instead of being made by deposition upon another plate of the same material, may be produced on a flat surface of wax or plaster properly prepared.

The application of this process to gold and silver plating is described in the article ELECTRO-METALLURGY.

VOLTAIRE, FRANÇOIS-MARIE AROUET DE, was born at Châtenay, near Sceaux, Feb. 20, 1694. His father was François Arouet, and his mother Marguerite Daumart, of a noble family of Poitou. Voltaire was the younger of two sons. He was educated at the Jesuits college of Louis le Grand. On leaving college he was introduced by his godfather, the Abbé Châteauneuf, to Ninon de l'Enclos, who bequeathed him a legacy of two thousand francs for the purchase of books. The abbé also introduced him to the brilliant society of Paris, which did not however entirely engross him; for he had already sketched his tragedy of 'Œdipe,' and in 1712 he was an unsuccessful candidate for a poetical prize awarded by the French Academy. In order to detach him from the society of Paris, his father sent Voltaire, in 1713, with the marquis de Châteauneuf, who was ambassador in Holland. Here he fell in love with a daughter of Madame Dunoyer, who disapproved of the connection, and complained to the ambassador, who sent Voltaire back to France.

Voltaire was now placed with a procureur, but the practice of the law was intolerable to him, and he soon left it. After spending a short time with M. de Caumartin at St. Ange, Voltaire returned to Paris, when having been accused of writing a satire against Louis XIV. who had just died, he was imprisoned in the Bastile. In his confinement he sketched the 'Henriade,' under the title of 'La Ligue,' and completed his tragedy of 'Œdipe.' He was soon released by the Regent. It is said that about this time he took the name of Voltaire. The tragedy of 'Œdipe' was played in 1718, and was successful.

In 1724 the play of 'Mariamne' appeared, and shortly after the 'Henriade,' under the title of 'La Ligue,' but without the author's consent, as it is said. A personal adventure led to a quarrel with the Duc de Sully, and shortly after to a second visit to the Bastile, where Voltaire was confined some months. On being released, he came to England, where he found a state of opinion more congenial to his own than in France. His residence in England, and the society which he saw, exercised a strong influence on him, but it was the religious rather than the political freedom of England which he admired. In England he wrote his tragedy of 'Brutus,' and in 1728, the first edition of the 'Henriade,' which the author himself superintended, appeared at London, with a dedication in English to Queen Caroline. His residence in England was about three years.

Voltaire returned to Paris, and for some time lived a quiet life, dividing his time between literary labour and some profitable commercial speculations. In 1730 the actress Adrienne Lecouvrer died, and the rites of sepulture were refused to her because she was an actress. Voltaire wrote some verses on the mode in which she was buried, full of invective, and withdrew to Rouen. At Rouen he printed his 'History of Charles XII. of Sweden,' and his 'Lettres Philosophiques.' The pub-

lication of the Lettres raised a fresh storm, which was increased by his 'Épître à Uranie,' and the author determined to retire for a time from Paris. His speculations, and what he had inherited from his father and his brother, had now given him a handsome fortune. He had also formed a connection with Madame du Chastelet, with whom he retired to Cirey, on the borders of Champagne and Lorraine, where they led a life of study, varied by an occasional quarrel. At Cirey Voltaire wrote several of his plays, 'Alzire,' 'Mahomet,' 'Mérope,' and others; and he collected materials for the 'Essai sur les Mœurs et l'Esprit des Nations,' which, with all its defects, is one of his best works. Here also he finished his 'Pucelle.'

It was in 1736, during his residence at Cirey, that a correspondence commenced between Prince Frederick, the son of Frederick William, king of Prussia, and Voltaire. Voltaire was at Brussels in 1740, when Frederick William died, and he soon received an invitation from his successor Frederick to visit him. An intimacy was established, and Voltaire corrected and saw through the press a treatise which Frederick had written, entitled 'Anti-Machiavel.' Voltaire's tragedy of 'Mahomet' was acted in 1741, at Lille; but not in Paris until 1751, on account of its supposed irreligious tendency. The author's opinions also prevented his election to the Académie Française in 1743, though the king, his mistress, and the public were in his favour. At this crisis France was threatened both by Austria and England, and it being thought prudent to secure the alliance of the King of Prussia, Voltaire was sent on a secret mission to sound Frederick as to his views, and he succeeded in drawing from him a favourable declaration. Voltaire, through the jealousy of the King's mistress, was left without his reward. The mistress however was soon dismissed; and when Madame de Pompadour filled the vacant place, Voltaire through her interest was made one of the forty members of the Académie, in the place of Bouhier (1746): he was also appointed historiographer of France, and obtained the place of gentilhomme ordinaire de la chambre du roi. After the death of Madame du Chastelet (Aug., 1749) Voltaire returned to Paris, and resumed his literary labours. King Frederick now prevailed on him to visit Prussia, where Voltaire went in 1750. He had apartments assigned to him at Potsdam, a pension of 20,000 francs, a chamberlain's gold key, and a cross of merit. His duty was to correct his majesty's writings, which was rather an irksome occupation. The history of his residence in Prussia is briefly sketched in Voltaire's 'Mémoires.' Voltaire at last got away, 'with a promise,' as he says, 'to return, and the firm resolution never to see Frederick again:' his residence in Prussia was three years.

After leading a wandering and unsettled life for some years, Voltaire bought an estate at Tourney and another at Ferney, both in the Pays de Gex, and he finally settled at Ferney, where he spent the last twenty years of his life in as much tranquillity as his character would allow. A little town grew up around him out of a miserable village. Houses were built at his own cost. He even rebuilt the church at his own expense. But his hasty proceedings in this matter brought him into difficulties. Complaint was made to the bishop of the diocese, and Voltaire, to quiet matters, went through the ceremony of taking the communion in the church of Ferney, an act of undoubted hypocrisy. In 1769 the bishop of Annecy had forbidden all priests to confess him, give him absolution, or allow him to take the communion. Upon this Voltaire took to his bed, pretended he was dying, and compelled a Capuchin to administer to him all the offices of the Roman Catholic Church which a true believer could claim. The whole farce was certified on the spot by a notary.

During his long residence at Ferney, Voltaire's literary activity was untiring. His rancour against priests and the Christian religion was now grown inveterate; and in his retirement he poured forth an unceasing torrent of ridicule, invective, and ribaldry. The poem of the 'Pucelle,' surreptitiously published, as he asserted, about 1755, added to the number of his enemies. It was not till 1762 that Voltaire published an edition of the 'Pucelle,' purged of much that was offensive: and this is the text of the 'Pucelle' which now appears in the best editions.

His literary quarrels and his correspondence also furnished the old age of Voltaire with constant employment. He had created a host of enemies, and he had to defend himself against their incessant attacks. He contributed some articles to the 'Encyclopédie,' on which he corresponded with D'Alembert. He had become reconciled to Frederick, and kept up a correspondence with him, though he forgot to burn the unfortunate 'Mémoires.' He also corresponded with the Empress Catherine II. of Russia.

But he had other occupations in his retirement, which show us another and more pleasing side of his character. Among the objects of his benevolence were the grand-niece of the dramatist Corneille, and the family of Calas, who had been falsely accused of the murder of his son, and broken on the wheel.

Voltaire was now eighty-four years of age. His niece, Madame Denis, who was weary of her retirement at Ferney, persuaded him to visit Paris. He arrived there Feb. 10, 1778, and was received with enthusiasm by all ranks, except by the court and the clergy. On the evening of the day on which he was present at a sitting of the Académie, he attended the sixth representation of his tragedy of 'Irene.' Between the two pieces his bust was placed on the stage and crowned by all the actors. From the theatre he was accompanied to his hotel by crowds, who cheered him loudly. Turning to them, he said, 'You will stifle me with roses.' He was detained at Paris longer than he intended, but the delay was fatal to his feeble frame, exhausted by excitement. The details of his death-bed are contradictory. He died May 30, 1778. The curé of St. Sulpice refused to bury the body of Voltaire, and the bishop of Troyes, Joseph de Barral, hearing that it was intended to bury him in the abbey of Scellières,

issued an order to the prior by which he forbade the interment. The order came too late, for the funeral was over; but the prior lost his place. The bones of Voltaire remained undisturbed till the Revolution, when they were brought to Paris, and interred in the Pantheon.

The best edition of the works of Voltaire is that of Lequien, Paris, 1820, 70 volumes, 8vo., of which the last volume consists of a copious index. The faults of Voltaire's character pervade his writings. As a poet, he fails to move the passions strongly, nor does he touch the more delicate sympathies of our nature. His dramatic writings are defective as dramas, if we measure them by our standard of excellence. His fertility and facility were unequalled. His satire and his sarcasm, and his sneer, were always ready and always effective. He seldom rises to eloquence, because he is not impassioned and sincere. But he never sinks into triviality: he is never tiresome; he is always lively and amusing. Clearness and precision characterise all his writings. When he is superficial, which is often the case, it is rather for want of taking pains to examine his subject with sufficient care, than from want of power to comprehend it.

VOLTAISM; VOLTAIC ELECTRICITY. These designations, as well as those of *Galvanism* and *Electro-Chemistry*, are all applied to the same science. This science, under most of its chief aspects, has been treated under Batteries and Galvanism; and it has received further illustration in the articles Attraction; Electricity; Electro-Dynamics; Electro-Magnetism; Electro-Metallurgy; Electrometer; Galvani; Galvanometer; Magnetism; Polarity; Telegraph; Volta; Voltagraphy. There are only a few concluding remarks necessary on this subject.

It is now generally admitted that all chemical action is connected with electrical action, and that they bear a direct relation to each other, that is, a certain constant quantity of electricity is evolved by the decomposition of each equivalent of any compound, though that quantity varies for different bodies; but it is not clearly known whether the electricity is the cause or the effect of the chemical action, they being perfectly contemporaneous and co-existent to all our means of observation.

All voltaic action is most easily and consistently explained as the effects of induction. [Polarity.] In the voltaic circuit the particles of the fluid form a part of the chain through which the induction, originated by the zinc on the fluid, is propagated. The chemical decomposition is connected with this polarity. The hydrogen of one particle of water quits its equivalent of oxygen to combine with that of the contiguous particle, and so on throughout till the hydrogen of the particles in contact with the conducting plate, having no oxygen wherewith to combine, is liberated at that surface in its gaseous state.

Although we are warranted in inferring by analogy that there may be other chemical sources of voltaic induction than oxidation of a metal, yet at present we are not acquainted with any other that can at all be compared with it in energy; and of all combinations by which this oxidation may be produced, the most efficient is that of a metal and a solution of a metallic salt, the acid of which has a greater affinity for the former metal than it has for that with which it is combined.

During electrolytic decomposition, or decomposition by means of galvanism, the elements of a compound are determined in definite directions to one or other pole of the battery: and hence the classification of those elements into electro-positive, or electro-negative, or into Cathions and Anions, according to the nomenclature proposed by Professor Faraday.

In the decomposition of water by means of a delicate electrical apparatus, the oxygen always goes to the negative pole, and the hydrogen to the positive pole; and in similar decomposition of æther, alcohol, oil, &c., the oxygen in like manner is found at the negative pole. It may be stated generally that if two rods of platina in communication with the poles of a voltaic battery be immersed in a saline solution, it will cause a separation of its constituent parts. When the current passes through solutions of neutral salts, coloured with vegetable blues, the part of the liquid at the negative pole is green; at the positive, red. When the water contains a solution of a metallic salt, as of zinc, lead, or copper, the negative wire receives a coating of the particular metal; and in the general electro-chemical decompositions, oxygen and the oxides are found at one pole, hydrogen and the bases at the other. Bodies thus susceptible of decomposition by the voltaic battery have been distinguished by the term *Electrolytes*.

VOLTERRA, a town of Tuscany, built on the site of Volaterræ, one of the most ancient of the Etruscan cities, is situated on a steep mountain, 27 miles S.E. from Leghorn, and has 4500 inhabitants. On the slopes N. of the town, consisting of tufa-rock covered with a thin coat of earth, are found the numerous sepulchral chambers, called by the Italians 'Ippogei,' to which Volterra owes its remarkable and unique museum of Etruscan cinerary sarcophagi, gold ornaments, gems, weights, bronzes, coins, and objects in terracotta. Some fragments of walls and an arched gateway of Etruscan workmanship are all that now remain of the ancient town. The huge blocks of stone in these structures are uncemented. The Etruscan arch is decorated with three colossal human heads, sculptured on the keystone and the two pilasters. The modern town is walled, and moreover defended by a citadel, partly constructed on the site of the ancient Etruscan walls. Within the enclosure of the citadel is the prison called Il Mastio; the citadel itself has been since 1818 a House of Correction, where prisoners are made to work at the making of woollen cloths and various other articles. Volterra contains a most interesting cathedral, built about 1254, several churches, a theatre, several palaces, a Monte-di-Pietà, and an antiquated town-hall, finished in 1257. In this building, on the ground-floor, is the museum of sarcophagi found in the tombs, and above is placed the public library. The streets are narrow, and, except the main streets, badly paved; the

houses are often of great antiquity. The chief business of the inhabitants is the carving of alabaster ware, with which they supply the markets of Florence, Leghorn, and Pisa.

VOLTERRA, DANIELE DI. [RICCIARELLI.]

VOLUME. This word, as meaning a part of a book, is derived from the old form of a book, a roll (of parchment). But our language takes from the French a sense of which the Latin knows nothing; and *volume* means bulk, size, or solid content. Thus the volume of a sphere is two-thirds of that of its circumscribed cylinder: the volume of a cone is one-third of that of a cylinder of the same base and altitude, and so on.

VOLUTE, a rolling or spiral curve, a name particularly given to the spirals which appear in architectural columns, as ornaments of the capitals.

VOLU'TIDÆ, the name of a family of Testaceous Gastropodous Mollusks, whose shells are prized by collectors above most others for their beauty and rarity; and which, from their numbers and carnivorous habits, are powerful agents in keeping other *Mollusca* and *Conchifera* within due limits.

Lamarck, in his 'Animaux sans Vertèbres,' truly observes that the genus *Voluta* of Linnæus, although characterised in a manner sufficiently distinct by the plaits on the pillar of the shell, is far from natural; for it unites shells of different families, which ought to be separated because they do not approximate at all. It comprises, says Lamarck, in fact, shells with an entire aperture, as the *Auriculæ*, others with an aperture which is canaliculated at the base, as the *Fasciolariæ*, and the *Turbinellæ*, which approach the *Murices*; and others again whose aperture is simply notched at the base, like that of the *Buccina*. This gives an extremely considerable extent to the genus, injurious to the study of species, and defective in regard to the relationship of the component forms.

Mr. Broderip remarks, that if any disciple of Linnæus should be disposed to consider the French naturalist somewhat severe, he should remember that, at the time when Lamarck wrote (1822), the number of recent species of *Volutæ*, strictly Linnæan, had increased from 45 to 288, viz.:—*Voluta*, Lam. 44; *Mitra*, 80; *Marginella*, 22; *Turbinella*, 25; *Columbella*, 18; *Auricula*, 14; *Cancellaria*, 12; *Tornatella*, 6; *Volvaria*, 5; *Oliva*, 62.

Since the appearance of Lamarck's work, the researches of naturalists have brought to light such numbers to swell the catalogue, that the species of many of these genera had, when Mr. Broderip wrote (1830), increased two-fold and even three-fold; and the last twenty years have added greatly to that amount.

Cuvier, Rang, Swainson, and G. R. Gray, have each published their arrangement of the *Volutidæ*, and to these authors we refer our readers.

Mr. Broderip subdivides the genus *Voluta* of Lamarck into *Cymba*, *Melo*, and *Voluta*. As examples of these genera we may mention, *Cymba Neptuni*, from the African coasts; *Melo Æthiopicus*, African and Indian seas; *Voluta undata*, from New Zealand; *Voluta Pacifica*, and *Voluta Vespertilio*, from the Indian seas. As examples of the genus *Mitra*, we may select *Mitra Episcopalis*, *Mitra adusta*, and *Mitra corrugata*. Of the genus *Oliva*, we may take *Oliva hiatula*, *Oliva subulata*, *Oliva porphyria*, and *Oliva textilina*, as examples.

VOLVA, in Botany, is the external membranous or fleshy covering which encloses the stipes and pileus of the young state of many of the order *Fungi*.

VONDEL, JOOST VON DEN, the great national poet of Holland, was born Nov. 17, 1587, at Cologne, to which city his parents had retired from Antwerp, in order to avoid the persecution to which they were exposed from the religious severity and jealousy of the Austrian-Spanish government. As soon however as the republic of the United Provinces was established, the family removed to Amsterdam. The education he received from his parents did not extend beyond the ordinary acquirement of reading and writing; for his father was only a tradesman, and he afterwards himself dealt in hosiery. For poetry he is said to have evinced a taste very early. It was not until he had reached about 26 years of age that he began to study Latin. Not only was his proficiency in the language rapid, but a decided improvement, both as to style and ideas, it is said, soon began to manifest itself in his compositions. His tragedies, which form so considerable a portion and so important a class of his productions, show him to have possessed far higher genius as a lyric poet than as a dramatist; for they owe their chief attraction to the 'Reien,' or chorusses, with which they are interspersed. A selection of them was made by De Vries, who published it in 1820. Among the more celebrated of his dramatic poems are his 'Palamedes,' 'Gijsbrecht von Amstel,' and 'Lucifer.' The first of these, which was a direct allusion to the fate of the grand-pensionary Barneveldt, was not published till 1625. It was prosecuted by those in power as treasonable, and he was sentenced to a fine of 300 guldens. The 'Gijsbrecht,' which was written by him for the opening of the new theatre at Amsterdam, in 1637, is justly considered one of his masterpieces, and is that which is most national in its subject. That however which possesses for us as Englishmen almost the charm of nationality is the 'Lucifer,' for it may be considered the precursor of our 'Paradise Lost,' which it anticipated by fourteen years.

To enumerate here all the productions of Vondel would be useless. Late in life he lost his wife, which was a severe blow to him, for it was she who had chiefly attended to the concerns of their business. From that time his circumstances grew worse, and his embarrassments were afterwards so much increased by the conduct of a spendthrift son, that at the age of seventy-two he was glad to obtain a situation with a small salary in a bank at Amsterdam. Even there however neither his energy nor his genius deserted him, for it was at this period that he composed, besides several other things, his 'Jephtha,' one of the best of his tragedies. At length, in 1668, he was permitted to retire, retaining his salary as a pension for life. He died Feb. 5, 1679.

VORONETZ, or WORONESCH, a government of Russia in Europe, situated between 48° 35′ and 52° 50′ N. lat., 37° 45′ and 43° E. long., is bounded N. by Tambow, E. by Saratow and the country of the Don Cossacks, S.W. by Ekaterinoslaw, and W. by Slobodsk-Ukraine. Its area is 25,591 square miles, and the population in 1846 was 1,657,900.

The face of the country is an undulating plain, traversed by low ridges and chalk hills. In most of the circles, of which the government contains 12, there are woods; in several, extensive commons; but only a few morasses and bogs. The soil consists partly of clay, partly of sand, for the most part covered with a pretty thick layer of vegetable mould, which is very fertile. The principal river is the Don, which receives most of the other rivers, such as the Voronetz, which is navigable by large barges; the Sosna, the Ikoretz, the Donez, and some others. The climate is temperate and healthy; the rivers freeze in December, and thaw in March.

Voronetz is one of the great corn-growing provinces of the empire; the fertile soil requires little or no manure; it is only suffered to lie fallow one year in five or six. The farmers grow wheat, barley, oats, buckwheat, millet, maize, poppies, lentils, peas, flax, and hemp. Agriculture is in a backward state. Horticulture is carefully attended to: the gardens produce all the kinds of vegetables that are grown in Germany. Hops, cherries, plums, some apples and pears, and a few grapes, are grown. The forests afford fine oak timber and firewood. The rich pastures and extensive commons are favourable to the breeding of cattle, which is a very general occupation of the inhabitants. There are numerous flocks of sheep and herds of swine. Oxen suffice only for the home consumption; there are many small studs of horses of Russian breed. Bees are very generally kept. The minerals are, iron, chalk, limestone, freestone, and saltpetre.

The manufactures, previous to 1836 of no great importance, are said to have made great progress since that year. The exports are the natural productions of the country, corn, cattle, hides, timber, bristles, some coarse cloth, saltpetre, honey, and wax.

Voronetz, the capital of the government, the residence of the governor and of the bishop of Voronetz, is situated in 51° 40′ N. lat., 39° 23′ E. long., on the river Voronetz, which falls into the Don two miles below the city. It is built on a very steep rock, and consists of three parts, the upper town, the lower town, and the suburbs. The upper town contains the residence of the governor and the public offices, the bishop's palace, the cathedral, the bazaar, and the town-hall. There are in the city 18 stone churches, 2 convents, a gymnasium, an ecclesiastical seminary, an arsenal, and several schools. The streets are very broad, but not paved. The manufactures are cloth for the army, leather, soap, and vitriol. There are some breweries and brandy-distilleries. The merchants of Voronetz trade with all parts of the Empire. *Ostrogohsk*, a small commercial town, with several churches, has 4000 inhabitants, who carry on an extensive trade; three great annual fairs are held.

VORTEX. The theory of Descartes on the formation and mechanical laws of the universe was first published in 1637, in his 'Principia Philosophiæ.' We shall here present a brief sketch of the system, so far as is necessary, from the third book of the 'Principia Philosophiæ:' this sketch is, as far as it goes, only a table of contents of the work itself, and Descartes may be supposed to be the speaker. Such comments as we add are in parentheses.

The human imagination must not either limit the power of God or unduly exalt its own: and it must not suppose that all things were made for man's use only. In enumerating phenomena Descartes prefers rather to deduce them from causes than to make them serve in finding causes. He then describes the relative distances of the planets, and asserts the immensity of the distances of the fixed stars. After the usual statements relative to the light of the sun, planets, and fixed stars, he rejects the Ptolemaic hypothesis, and observes that those of Copernicus and Tycho Brahé differ very little as hypotheses, and explain phenomena in the same manner. He says also that the latter, though he denies the motion of the earth, yet in reality gives it more motion than the former (with Descartes relative motion was a most absolute idea); whence, differing from both, he will, with more truth than Tycho, and more care than Copernicus, take away the motion of the earth. To this end he proposes an hypothesis, which will be very fit to explain phenomena; but only as an hypothesis, not as an absolute truth. The fixed stars are exceedingly distant; the sun consists of a fluid and mobile matter, which would carry the circumjacent parts of the heavens with it, but which does not change its place in the heavens: the solar matter does not need aliment. Each one of the fixed stars has an immense space about it, in which there is no other fixed star. The heavens are filled with fluid matter, as astronomers commonly suppose, because they do not see how the phenomena of the planets can be otherwise explained. Each* of the heavens carries with it all bodies therein contained. The earth and every planet is at rest in its heaven, though it may be carried with that heaven: the earth therefore, or any one planet, may be said not to move, but all the others must be said to move. The whole heaven of the sun is moved round it in the manner of a whirlpool, 'in modum cujusdam vorticis,' the more distant parts moving more slowly than the nearer; and the planets are carried round with this heaven. And as in the larger whirlpool are sometimes seen smaller ones, which are carried round in the larger; so each planet is the centre of a smaller vortex, in which its satellites are carried round their primary. The sun and planets are carried round their axes by the motion of their vortices (the inclinations of the planetary orbits to the ecliptic have an obvious explanation: the inequalities in longitude are

* The matter in the space about a planet, or star, which is under the influence of that planet, is called its *Heaven*.

mentioned without explanation). It can hardly be that an hypothesis which thus explains phenomena can be false: to say this would seem to be an imputation upon the Deity, namely, the supposition that he made us so imperfect, that a right use of reason might lead us to deceive ourselves (Descartes is not the only one who has used this sort of argument). Nevertheless, he is willing that it should be put forward only as an hypothesis. And though both religion and reason teach that God made the world complete, that not only the seeds of plants were formed, but plants themselves, &c., yet the nature of things will be better explained if it can be shown how, as from seed, the solar system was produced. (Descartes here fears the imputation which was afterwards cast upon the author of the *nebular hypothesis*.) All matter originally consisted of particles, forming numbers of fluid heavens, revolving about their several axes. These particles were originally equal in size and motion; they also became spherical, when the corners had been worn down by rubbing against each other. And since no portion of space can be vacuous, the interstices of these spheres must be filled by matter, of form perpetually changing, derived from the parts worn off the angles: this last kind of matter moves more quickly than the other. Besides this there is a third sort of particles of matter, more solid, or else of form more adapted to motion: of this planets and comets are composed. There are three classes of celestial heavens: the first, that of our sun and its system; the second, the various heavens of the fixed stars immediately adjoining; the third including all which are beyond, and which never can be seen in this life. The primary particles, as those are called which are obtained by attrition from the secondary particles, at last become more than enough to fill the intervening spaces (how this could be Descartes does not say), and the residue, as fast as it arises, was forced to the centres of the vortices, where it formed certain very fluid spherical bodies: these are the sun and fixed stars. The secondary particles receded from the centres to make room. The efflux of these primary particles from the fluid bodies just described is light. The centrifugal force of particles in motion round a centre is then dwelt on, and the circular form of the sun and fixed stars is attributed to it. The motion of the vortices must be such that their contiguous parts may have a common motion. The primary particles flow from the poles of each vortex towards the centre, and from the centre towards the other parts. But the same must not be said of the secondary or spherical particles. (The reasons given are fanciful in the extreme, consisting entirely in different motive powers given to the two species of particles.)

As the hypothesis of vortices is usually represented, it has a certain reasonableness of appearance, which no doubt makes many wonder why it should be so universally contemned. If a fluid mass were whirled round the sun, it would carry the planets with it: and the supposition of minor vortices, one round each planet which has a satellite, is perfectly consistent with the laws of hydrostatics. When Newton proposed to refute the system of Descartes, he was obliged to have recourse to numerical considerations: he could not but admit that a planet, in one of Descartes' vortices, would have an orbit; but he showed, from the nature of fluid motion, that it could not have the orbit which, from the time of Kepler, it was known to have. No other mechanical difficulty stood in the way; and those who had seen particles of dust whirled about by the air would have no difficulty in imagining the hypothesis of a vortex. Now we find this fault with the common notion of Descartes' system. The disparagement which belongs to it *as a whole*—to the primary and secondary particles which, though obtained from the same original particles, yet have different laws of motion, and to the gratuitous deduction of everything from this fancy—is conveyed to their readers by writers who only present the most rational extract which could be made, namely, the idea of a vortex. This is the sort of syllogism on which the readers of such writers must proceed: Descartes' system is ridiculous; all I know of that system is its vortices, therefore I must laugh at the vortices. Yet not only was Newton obliged to have recourse to his most powerful weapons to refute these vortices, but it is not at all a settled point that his refutation is sound; that is, his mathematical refutation. His remark that comets could not find their way through the vortex is much more to the purpose, though Descartes has his way out of this difficulty, as out of every other.

VOS, MARTIN DE, was born at Antwerp, probably in 1531. His father, Peter de Vos, who was a painter, gave him the first instruction in his art, and he afterwards attended the school of Frans Floris. He next went to Italy, where he studied at Rome, and at Venice with Tintoretto, whose style he adopted, and for whom he painted several landscapes as backgrounds to some of his pictures. He distinguished himself in history and portrait, and painted many portraits for the house of Medici. After a stay of eight years in Italy he returned to Antwerp, where he was made a member of the Academy. He executed an immense number of works: there are more than six hundred prints after his designs. He died in 1603 or 1604.

VOSGES, in German VOGESEN, or WASGAU, a chain of mountains bounding the valley of the Rhine on the west from the neighbourhood of Mühlhausen to that of Mayence. The chain is partly in France and partly in the Rhenish province of Bavaria. The Vosges unite on the southwest with the Faucilles, and so with the Côte d'Or, and ultimately with the Cévennes; and on the south they unite with offsets of the Jura, not far from Belfort in the department of Haut-Rhin. Cæsar, the earliest writer who has mentioned the Vosges, which he calls Mons Vosegus, evidently included the Faucilles under this designation, since he places in them the source of the Mosa, or Meuse, which is far westward of the Vosges in the present more limited acceptation of the name. The length of the Vosges is more

than 170 miles from the depression through which the Canal du-Rhone-au-Rhin passes between Béfort and Altkirch, to the sharp bend made by the Rhine between Mayence and Bingen. The breadth of the range varies. In the northern part, about Mont Tonnerre, it is nearly 30 miles; but this breadth comprehends the lower slopes as well as the higher parts of the range. West of Strasbourg the breadth is about 20 miles. Between Colmar and Plombières, where a branch extends westward from the principal range, the breadth is nearly 40 miles. Another branch extends in a south-western direction from the southern extremity of the main chain into the department of Haute-Saône.

The loftiest summits of the range are in a tolerably direct line, extending from Mont Tonnerre, in the Rhenish province of Bavaria, to the Ballon d'Alsace, in the department of Haut-Rhin in France; and in a line extending nearly at right angles to the foregoing, from the Ballon d'Alsace towards Plombières. The following are the principal summits:—

Ballon de Lure, 3721 feet; Ballon de Servance, 3970 feet; Ballon d'Alsace, 4124 feet; near the source of the Moselle; Ballon de Soultz, or de Guebwiller, 4695 feet; Le Bressoir, 4049 feet; near the source of the Meurthe. Le Champ de Feu, 3537 feet, near Schirmeck; and Mont Tonnerre, 2924 feet. The part of the range which is N. of the valley of the Bruche is sometimes termed Les Basses-Vosges, and is known to the Germans by the name of *Hardt*. The eastern slope of the mountains consists of a succession of steep declivities; the valleys on this side are deeper than those of the west side, where a slightly undulated surface gradually descends into the plain of Lorraine.

The part of the range extending between the Bruche and Béfort, and also the spur that extends westwards to Plombières, consists chiefly of granitic rocks, intermingled with others containing organic remains. They ordinarily present rounded summits, which are called by the inhabitants of the district Ballons. The region of the granitic rocks is skirted by ranges of mountains of a character altogether different, of square form and more horizontal outline, and composed of a reddish quartzose sandstone, known as the sandstone of the Vosges. North of Schirmeck this sandstone forms the mass of the Vosges, and presents a range of heights of tolerably uniform elevation, but of unequal breadth.

The Vosges yield a variety of valuable minerals. Coal is found in various parts. Iron-ore is obtained, and a great number of iron-works are established in the neighbouring country. Other metallic ores found are copper, lead, manganese, and arsenic.

The summits of the Vosges are covered with snow during a part of the year. The greater part of the mountains are wooded to a certain height; their summits are covered with large spaces of green turf, to which, during six months of the year, herds of cows are led to graze. The herdsmen dwell in huts, and make cheeses like those of Gruyère. The forests are chiefly composed of firs, pines, oaks, and chestnut-trees. The variety of vegetation which the mountains present renders them interesting to the botanist; and the scenery in many parts is very picturesque.

VOSGES, a department in France, formed out of south Lorraine, is bounded N. by the departments of Meuse and Meurthe, E. by Bas-Rhin and Haut-Rhin, S. by Haute-Saône, and W. by Haute-Marne. Its mean length from E. to W. is 67 miles, from N. to S. 34 miles. Its area is 2262½ square miles, and the population is 427,894, which gives 189.12 to the square mile, or 15.37 above the average per square mile for the whole of France.

The department is mountainous. The west and north-west of the department are called *the Plain*, though the surface is far from level. The Vosges Mountains, from which it takes its name, extend along the eastern boundary; and the Faucilles Mountains traverse the south of the department from W. to E., uniting with the branches of the Vosges in the south-east of the department. The Vosges present a great variety of picturesque and delightful scenery. The Ballon-d'Alsace, one of their highest summits, at the point where the branch which joins the Faucilles diverges from the main chain, is 4100 feet high; Le-Bresoir, a neighbouring summit, is 4038 feet; and Le-Grand-Donon, farther north, is 3313 feet. The mineral treasures of the department are granite, porphyry, black freestone, millstones, slates, gypsum, agates, coal, lead, and iron. There are 34 iron-works, for manufacturing pig-iron, bar-iron, and steel.

The department lies on the watershed between the Mediterranean, the North Sea, and the English Channel. The greatest part of it belongs to the basin of the Rhine, the north-eastern corner being drained by the Bruche, and the central parts by the MOSELLE and its tributaries. The west of the department is included in the basin of the MEUSE, and is drained by that river and its feeders. The north-western angle is drained by the Ornain, which belongs to the system of the Seine. The southern slope of the Faucilles Mountains belongs to the basin of the Rhône, and is drained by the SAÔNE and its earliest feeders. Irrigation is well managed; and considerable skill is shown in applying streams and falls of water as a moving power to the purposes of manufacture. There are mineral-springs, and several small lakes, chiefly in the east of the department. The department is crossed by 6 national, 22 departmental, and several parish roads, with an aggregate length of 3000 miles.

The area of the department is 1,448,000 acres, of which about 600,000 acres are under the plough. The produce of the department in grain is barely adequate to the supply of the population. The principal crop is oats, of which a vast quantity is raised; but of barley, wheat, rye, and maslin, the quantity grown is below the average of the departments. Buckwheat, millet, hops, and potatoes, are grown; also turnips, hemp, flax, gentian, plums, and cherries for making kirschwasser. The grass-lands amount to 180,000 acres, and the heaths and open pastures to about

in 1649. Vossius was a man of extraordinary learning, and had a powerful memory. He was an humble and devout man, and always ready to serve others. He was extremely careful in employing his time, and scarcely ever allowed a friend to stay with him more than a quarter of an hour. He hated nothing more cordially than the theological squabbles and the calumnies with which the scholars of that time assailed one another. His writings, most of which relate to classical antiquity, are very numerous, and some of them necessary to a scholar. They were collected at Amsterdam, 1695–1701, in 6 vols. fol.

VOSSIUS, ISAAC, a son of Gerard Vossius by his second wife, and the only child that survived him, was born at Leyden in 1618. After he had completed his studies he travelled for three years through Italy, France, and England, during which time he collected many valuable MSS. of ancient writers. Queen Christina invited him, in 1648, to Sweden, and Vossius enjoyed for many years her esteem and friendship, and gave her instruction in the Greek language. Salmasius (Saumaise) was one of the scholars whom Christina drew to her court, and for whom she entertained a very high regard. But Salmasius always treated Vossius in an insolent manner, and when at last the Queen was informed that Vossius was going to write against him, she refused to admit him to her presence, whereupon Vossius went back to Holland, in 1658, and never returned to Sweden. For some cause he left Holland, and in 1670 he came to England. At Oxford he was made a doctor of laws, and in 1673 King Charles II. made him a canon of Windsor, and assigned to him apartments in the castle, where he remained until his death, on the 10th of February, 1688. The splendid library of books and MSS. which he had collected, and which was considered one of the most complete private collections in Europe, was purchased by the university of Leyden.

Isaac Vossius was almost as learned as his father; but he is said to have been of dissolute habits, and to have had no religious belief, though a divine and a canon of Windsor. A list of his principal works is given in the article 'Vossius, Isaac,' in the 'Penny Cyclopædia.'

VOUET, SIMON, commonly considered the founder of the French school of painting, was born at Paris in 1582. He was instructed by his father Laurent Vouet, and distinguished himself at a very early age. Baron de Sancy, French ambassador to the Porte, took Vouet with him to Constantinople in 1611, where he painted an excellent portrait of the Sultan Achmet I. He next went to Venice, and in 1613 to Rome. His reputation procured him a pension from Louis XIII. while he was in Rome, where he was made president of the Academy of St. Luke; and in 1627 Louis recalled him to Paris, gave him the title of principal painter to the king, and apartments in the Louvre. His commissions were so numerous that he was obliged to entrust nearly the entire execution of many of his works to his pupils. He painted with great facility in a style peculiar to himself; it was gay, yet feeble in colouring, owing to a want of harmony in the composition of colour. He is more distinguished for several excellent painters who were educated by him than for his paintings. He died in Paris in 1641. There are about 200 prints after his works, the principal of which are—the chapel and gallery of the Palais Royal; some works in the Hôtel de Bullion; a ceiling in the Hôtel de Bretonvilliers, &c., besides altar-pieces and miscellaneous works.

VOUZIERS. [Ardennes.]

VRIES, HANS FREDEMAN DE, was born in 1527, at Leeuwaarden in Friesland. He was bound for five years to a painter of Amsterdam. He painted some time at Mechlin, and settled for a time at Antwerp, where, in 1549, he was employed with other painters to paint the triumphal arches erected in honour of the entry of Charles V. and his son Philip. He afterwards visited many cities of Germany. De Vries was a complete master of perspective; he published a treatise upon the science, which was afterwards enlarged by Samuel Marolois. His paintings are very true, and his drawings and designs were numerous. There have been published twenty-six books of prints by him, illustrating various styles of architecture, with views of buildings, villas, &c. The date of his death is not known.

VULCAN (Latin, 'Vulcánus;' Greek, 'Hephæstus,' Ἥφαιστος), the god of fire. According to Homer, he was the son of Zeus (Jupiter) and Hera (Juno), and was from his birth so weakly and ugly, that his mother, wishing to get rid of him, dropped him from Olympus. But Thetis and Eurýnome, two marine divinities, received him when he fell, and with them he dwelt concealed for nine years, during which he made various beautiful ornaments for the two goddesses. Though his mother had treated him so ill, on one occasion he took her part against his father, when Zeus seized him by the foot and hurled him from Olympus. He fell for a whole day, and came down on the island of Lemnos. He afterwards returned to Olympus, where he inhabited a palace built by himself. Here he had his workshop with its anvil and twenty bellows, which worked at his bidding, and he produced the most exquisite specimens of art both for gods and men. His wife is called in the 'Iliad' Charis, but in the 'Odyssey' it is Aphrodite (Venus), who, however, is faithless to him. This is an outline of the story of Vulcan, as far as it can be gathered from the Homeric poems. According to Virgil and others, Vulcan was assisted by the Cyclópes, and his workshop was not in Olympus, but in some volcanic island. His favourite island was Lemnos, but other volcanic islands also, such as Lípara, Hiera, Imbros, and Mount Ætna in Sicily, are described as places in which Vulcan worked.

VULGATE. The Vulgate (*Vulgata Versio*), or common version, is the name sometimes given by St. Jerome to what he elsewhere calls the *Vetus*, or ancient version, and what Augustinus calls the *Vetus Itala*, or Old Italian Version, being the most generally received of those early Latin translations of the Scriptures distinguished by biblical critics as the ante-Hieronymian, all which are now lost, with the exception of some parts of this

Vetus Itala, and such fragments of the others as are quoted in the writings of the Fathers. Jerome's first labours as a translator of the Scriptures consisted in a revision and correction of this original Vulgate, which he completed about A.D. 390. Before this date however he had commenced an entirely new translation from the original Greek and Hebrew; and it is this to which the name of the Vulgate is now given. The earlier Vulgate, as revised by Jerome, has all perished, except only the Book of Psalms and the Book of Job, and the apocryphal Books of Maccabees, Baruch, Ecclesiasticus, and Wisdom. Ever since the seventh century, when it was sanctioned by Pope Gregory I., Jerome's new version has been exclusively adopted by the Romish church. All the Romish translations of the Bible into the modern languages profess to have been made from the Vulgate.

After the invention of printing the Latin Bible was the first considerable work that was sent to the press; but the earliest editions exhibited a very corrupt text. The first critical editions were those produced at Paris, by Robert Stephens (Etienne), in 1528, 1532, 1534, 1540, 1545, and 1546. Of these the edition of 1540 is accounted the best.

The first revised edition of the Vulgate promulgated by authority in the Romish church was issued at Rome from the press of the Vatican, in three volumes, folio, in 1590, under the title of 'Biblia Sacra Latina, Vulgatæ editionis, jussu Sixti V. recognita et edita.' This edition, the preparation of which had been begun under Pius IV., was declared by Pope Sixtus to be the authentic text, and is known as the Sixtine Vulgate, or the Bible of Sixtus V. But it was soon discovered to be full of misprints and other errors; and Gregory XIV., who succeeded Sixtus V., ordered it to be suppressed. A new edition of it, in the same form, was brought out in 1592, under the authority of Gregory's successor, Clement VIII., and this is called the Clementine Vulgate, or more frequently by Roman Catholic writers the corrected Bible of Sixtus V. It is now the authorised edition in the Romish church; the Vulgate as since printed being commonly entitled 'Biblia Sacra Latina, Vulgatæ editionis Sixti V. et Clementis VIII.'

VULPE'CULA ET ANSER (the Fox and the Goose), a constellation of Hevelius, situated immediately above Aquila and Sagitta.

VULPILIN, or VULPINIC ACID, is obtained from the *Lichen vulpinus* of Linnæus. It has the form of yellow rectangular prisms; it is transparent, not altered by exposure to the air, melts when heated, and reassumes the crystalline state on cooling. It may be volatilised without decomposition.

VULTURE. [VULTURIDÆ.]

VULTU'RIDÆ, a family of Raptorial Birds. [RAPTORES.]

It has been matter of dispute whether they are directed to their fetid food (for they seldom prey on living animals) by the eye or by the nasal organ. There can however in our opinion be little doubt that both the senses are made to contribute to the discovery of the carcass. The lofty flight and telescopic eye are well adapted to detect any dying or dead animal, and, as the action of one vulture may be, in all probability is, watched by another, a sort of telegraphic communication as to the position of the object is kept up.

The Prince of Musignano, in his 'Conspectus,' divides the *Vulturidæ* into the following subfamilies, viz. *Cathartinæ*, *Vulturinæ*, *Gypaëtinæ*, and *Gyphieracinæ*.

The *Vulturidæ* of Mr. G. R. Gray form the first family of his first suborder (*Accipitres Diurni*) of his first order (*Accipitres*). The following subfamilies and genera are placed by Mr. Gray under this family:—

Subfam. 1, *Gypaëtinæ*.

Genus, *Gypaëtos*.

Subfam. 2, *Cathartinæ*.

Genera, *Neophron*, *Cathartes*, *Sarcoramphus*.

Subfam. 3, *Vulturinæ*.

Genera, *Gyps*, *Vultur*, *Otogyps*.

Subfam. 4, *Racaminæ*.

Genera, *Gyphierax*, *Racama*, *Vultur* (*Gyphierax*) *Angolensis*.

For the arrangement of Mr. Vigors, see 'Linn. Trans.,' vol. xiv., and 'Zool. Journal,' vol. ii. Mr. Swainson's views are published in his 'Classification of Birds.'

Mr. Vigors in the 'Zoological Journal' gives the following summary of his views:—'If we fix our attention on the distinguishing characters of the Vultures, and at the same time take into consideration the size and strength and consequent powers of body that separate the Vultures from other groups in ornithology, we may at once determine that the birds in which these characters are most strongly conspicuous will form the typical group of the family.' These species therefore, he remarks, 'may be selected as forming the *Normal Group* of the *Vulturidæ*, in which the powers of the bill and legs are most apparent, the head and neck most devoid of feathers, and the organs of smell most fully developed.' This group, he observes, 'will be found chiefly to inhabit the torrid regions, and their food to be, almost exclusively, carrion, which they prey upon for the most part in large flocks. On the other hand, the *Aberrant Group* will comprise those birds which exhibit a comparative weakness in the bill and legs, a less extension of the organs of smell, and a smaller portion of the head and neck devoid of plumage; or where, although some degree of the size and strength of the more typical birds is preserved, the greater part of the head and neck is covered with feathers.' This group, Mr. Vigors adds, 'may be observed to spread itself over the higher and colder latitudes more extensively than the typical Vultures, and to seek occasionally a living prey, which they frequently pursue either singly or by pairs.'

'The vultures,' says Mr. Swainson, 'are the great scavengers of nature in hot latitudes, where putrefaction is most rapid, and most injurious to health; and the disposition of their numbers is regulated by an all-wise Creator according to their usefulness. They are sparingly scattered over the south of Europe: in Egypt they are more nume-

rous; but in tropical America, although the species are fewer, the individuals are much more plentiful. No sooner is an animal dead than its carcass is surrounded by numbers of these birds, who suddenly appear, coming from all quarters, in situations where not one had just before been seen. The nakedness of the head, and frequently of the neck, is most apparent in those whose geographic range is limited to the New World, at the head of which division stand two remarkable species, the celebrated Condor of the Andes, and the *Papa*, or King Vulture, of the Brazilian forests. The first is well known for the loftiness of its flight and its amazing strength, while the latter is the only species whose colouring is not dark or sombre.'

From the filthiness of their food, the *Vulturidæ* emit from the skin and feathers a fetid odour. They gorge themselves to repletion, and become partially torpid, and if molested during this inactivity, disgorge the nauseous contents of their stomach over their luckless assailant.

European Vultures.

Vultur fulvus, the Griffon Vulture. Head and neck clothed with down, a ruff of white feathers round the base of the neck. Length exceeding four feet. This is *Le Griffon* of the French; *Weissköpfiger Geier* of the Germans; *Avoltoio di Color Castagno* of the Italians.

This vulture inhabits the mountainous parts of the north of Europe, Silesia, the Tyrol, Dalmatia (where it is very numerous), Spain (abundant near Gibraltar), the Alps, the Pyrenees, Turkey, the Grecian Archipelago, the north of Persia, the north of Africa.

The nest of the Griffon Vulture is generally formed upon the most elevated and inaccessible rocks, but it often builds on the highest forest trees, and, in Sardinia, on the loftiest oaks, where the nest of brushwood and roots is more than three feet in diameter. The eggs are generally two.

Vultur cinereus, the Ash Vulture. Back of the neck denuded of feathers, sides of the neck furnished with curled feathers. This is the *Vautour Noir* of the French; *Cinereous* or *Ash*

Ash Vulture (*Vultur cinereus*).

Vulture and *Bengal Vulture* of Latham; and *Grauer Geier* of the Germans.

The Ash Vulture is found among the lofty mountains and vast forests of Hungary, the Tyrol, and the Pyrenees; the south of Spain and Italy; accidentally in Dalmatia; more common in Sardinia.

According to Bechstein the Cinereous Vulture is chiefly seen in the plains in winter, where it attacks not only hares, sheep, and goats, but even deer. The farmers are said to suffer severely from its depredations, for it will frequently pick out the eyes of a sheep; but it is not shy, and suffers the approach of the hunter, who is well paid for shooting the destroyer.

Gypaëtus barbatus. Head and neck clothed; tail graduated; iris orange red, or fiery red. Lower jaw bearded. This is the *Lämmergeier* of the Germans. It is the *Avoltoio barbuto* of the Italians, and *Bearded Vulture* of the English.

Geographical Distribution.—The highest mountains of Europe, Asia, and Africa, the chain of the Pyrenees, and the Helvetian Alps, Sardinia, Greece, and the Tyrol. In Asia, the chain of the Caucasus, the Himalaya Mountains, the Siberian and Persian Mountains. The most lofty mountains of Central Africa and towards the borders of the Red Sea, principally in the most inaccessible parts of those mountains, and where there is plenty of the larger sort of game. But it becomes more and more rare in proportion as man advances upon the uncultivated regions which it loves to haunt. M. Temminck remarks, that it is now one of the rarest birds of Europe; whereas, formerly, all the high mountains of the Tyrol, Switzerland, and Germany were peopled with the species. It is still common in Sardinia. M. Temminck adds that he has received individuals from the north of Africa, and a considerable number from the Cape of Good Hope; none of these differed from the individuals belonging to the European Alps.

Habits, &c.—'Unlike the typical vultures,' says Mr. Gould, 'which are distinguished by their bare necks, indicative of their propensity for feeding on carrion, the Lämmergeier has the neck thickly covered with feathers, resembling those of the true eagles, with which it also accords in its bold and predatory habits, pouncing with violent impetuosity on animals exceeding itself in size; hence the young Chamois, the Wild Goat, the Mountain Hare, and various species of birds, find in it a formidable and ferocious enemy. Having seized its prey, the Lämmergeier devours it upon the spot, the straight form of the talons disabling the bird from carrying it to a distance (except in morsels, to its young). It refuses flesh in a state of putrefaction, unless sharply pressed by hunger; hence nature has limited this species as to numbers: while, on the other hand, to the vultures which are destined to clear the earth from animal matter in a state of decomposition, and thus render the utmost service to man in the countries where they abound, she has given an almost illimitable increase.'

The two white eggs marked with brown blotches are said to be laid on the naked summits of precipitous rocks which are almost inaccessible.

The only Vulture which, as far as we can find, has ever been found in a wild state in Britain, is the *Neophron percnopterus*. Forehead and circumference of the face naked; neck feathered. This is the *Vautour Ourigourap* of Le Vaillant, the *Pharaoh's Hen* of Bruce and others, *Avoltoio aquilino* and *Caporaccajo* of the Italians, and *Maltese Vulture* of Latham.

Geographical Distribution.—Found (very rarely) in the north of Europe, in Switzerland in the neighbourhood of Geneva. Very common in Spain on the Pyrenees, Portugal, Malta, Turkey, and in the Archipelago. Nowhere so abundant as in Africa. Russia as far north as Astracan, Arabia, Persia; the Deccan (Col. Sykes). M. Temminck states that individuals from the south of Africa are always larger than those of Egypt and Europe, and that it is very common in the Isle of Elba and Tuscany.

Habits, &c.—This vulture does not congregate, except when the all-attractive carcass calls them together, but goes in pairs, the male and female seldom parting company. 'In the districts which this species inhabits,' says Mr. Yarrell, 'every group of the natives has a pair of these vultures attached to it. The birds roost on the trees in the vicinity, or on the fences which bound the enclosures formed for their cattle. They are to a certain degree domiciled and harmless. The people do them no injury: on the contrary, they are glad to see and encourage them, because they clean the premises of all the offal and filth they can find. In default of other food they eat frogs, lizards, and snakes. They make their nests among rocks, and the Hottentots assured M. le Vaillant that they laid three and sometimes four eggs: but this he had no opportunity of verifying. The eggs are white.' The young are assiduously attended and fed by the parents for the first four months. In Cairo these vultures are so much prized for their scavengering services, for no excrement or filth comes amiss to them, that it is a breach of order to kill them. Col. Sykes states that in the Deccan they are always found in cantonments and camps. For the most part of the day they continue on the wing, soaring in circles. When on the ground, they walk with a peculiar gait, lifting their legs very high.

Asiatic Vultures.

Vultur Ponticerianus, the *Pondicherry Vulture*. Head and neck naked, excepting a few short scattered hairs thereon. Locality, Bengal, India generally, Java, and Sumatra.

Vultur Indicus, the Indian Vulture. Locality, India and Ceylon. Head and neck denuded.

Vultur leuconotus, the Chinese Vulture. Allied to the Indian Vulture. This fine bird is very voracious, feeding upon dead fish thrown up by the waves on the shore, and on carrion generally.

African Vultures.

Vultur Kolbii, Kolbe's Vulture. Allied to the Griffon Vulture. Locality, Barbary and other parts of Africa; also India and Java; several have been killed in Sardinia.

Vultur auricularis, the Sociable Vulture. Head and neck naked; with folds of lax skin; a gigantic and powerful species, common in South Africa, breeding in the fissures of lofty rocks, and, as Le Vaillant states, gregarious in its habits. It has been observed in North Africa, and in Greece.

This species is the *Oricon* of Le Vaillant, in whose 'Travels' will be found a spirited account of its habits and manners.

American Vultures.

An account of the CONDOR and TURKEY-BUZZARD is given under those articles, and we must here limit ourselves to a description of

Sarcoramphus papa, the *King Vulture*, or *King of the Vultures*. Skin of the head and neck bare, and brilliantly coloured.

Habits, &c.—With a highly-developed sense of smelling and a piercing sight, the expanse and strength of the wing of the King Vulture enables it to reach a lofty height, and there remain, bringing its powers of observation to bear over a wide tract of country. Patient under hunger, this vulture is said never to attack birds and quadrupeds, however small, while they are alive; though, when pressed with hunger from the want of its favourite carrion, it will feed upon snakes and lizards. A plentiful and inviting table is spread for it during the summer in the dried-up lakes reeking with the putrid fish which have there perished. Perched on the highest trees, it is most frequently to be seen alone or in pairs; but in Mexico travellers state that they have seen it in large flocks. The story that the other vultures stand patiently by till this, their monarch, has finished his repast, appears to be not without foundation, and may be easily accounted for by the superior strength and courage of this species. The general opinion seems to be that these vultures make their nests in the hollows of trees, and that they lay two eggs.

Geographical Distribution.—Wide. Occasionally in Florida, in the United States, which is probably the northern limit. Common in Paraguay, but, according to D'Azara, not going beyond 32° S. lat. Between the limits, especially towards the central parts of America, it appears to be abundant.

W performs the double office of a consonant and a vowel, the natural order of the vowels being *i, e, a, o, u.* The sounds of *i,* that is *ee,* and of *u,* that is *oo,* are the most remote, and the attempt to pass with rapidity from either of these to the others, more particularly to the other extreme, gives an initial breathing which has the character of a consonant, in the one case *ee-oo,* or *you;* in the other *oo-ee,* or *we.* Accordingly the letters *y* and *w* appear as the representatives, sometimes of a consonant, sometimes of a vowel. The English character *w* is formed by the repetition of a *v,* which itself is only a variety of the symbol *u.* In Latin the *v* or *u consonans* had probably the power of a *w,* a supposition which accounts for the use of a common character for the vowel and consonant. The Greek and Hebrew alphabets had also a single symbol for this consonant, which occupied the sixth place, and is called digamma in the former, *vau* or *waf* in the latter. But in the Greek alphabet the letter went out of use, and is therefore commonly omitted in our grammars of that language, although the gap at this point in the alphabetical designation of numbers still bears evidence to the original position of the letter. Most of the modern languages of Europe are deficient in a symbol for this letter. The French employ the diphthong *ou* prefixed to a vowel, as in the common particle *oui;* the Spaniards prefer *hu,* as in *huevo, hueso.* At other times the Spaniards have employed the letters *gu,* as may be seen in the different rivers of Spain Proper, which have prefixed the Arabic word *guad,* denoting water. The ancient Greeks often prefixed a simple *o* to represent a *w,* as in *οἰδα,* &c. The use of *w* as a vowel, so far as our own language is concerned, is confined to the end of syllables; and there is always another vowel prefixed to it, as in *new, law, show,* but in the Welsh language it is employed by itself, and in the middle of syllables with the power of a vowel. The map of Wales will furnish abundant examples, as Pwlheli, Cwmtydr, Bettws, &c.

The other interchanges of this letter have been already given under the preceding letters. [See C, G, H, M, O, R, S, and F.]

WACHENDO'RFIA, a genus of plants belonging to the natural order *Hæmodoraceæ. W. thyrsifolia,* Tall-Flowering Wachendorfia, is a native of the Cape of Good Hope, and thrives well in greenhouses in this country. The flowers are of a fine golden colour. *W. paniculata,* Spreading-Panicled Wachendorfia, is also a native of the Cape of Good Hope. From the colour of its root it is often called Red-Bulb. *W. hirsuta,* Hairy Wachendorfia, was found at the Cape of Good Hope by Thunberg. It is distinguished from the other species by its narrow leaves covered with long white hairs. The flowers are large and of a bright yellow colour.

WACHTER, JOHN GEORGE, was born at Memmingen in Suabia, in 1673. He studied classical, oriental, and modern languages, and became early known for his learning. Combining great sagacity and a sound judgment with an extensive stock of knowledge, he was able to produce works some of which are still among the best of their kind. For some time he was employed in the Museum of Antiquities in Berlin, and was chosen member of the Royal Academy of Sciences of that city. However, the first kings of Prussia, Frederic I. and William I., showed little disposition to promote the arts and sciences, and Wachter left Prussia for Leipzig, where he was appointed first librarian and director of the Museum of Antiquities. He died in 1757. Among his works are 'Glossarii Germanici, &c., Specimen ex ampliore Farragine decerptum,' Leipzig, 1727, 8vo.; this work was the forerunner of 'Glossarium Germanicum, continens Origines et Antiquitates totius Linguæ Germanicæ,' Leipzig, 1736-37, 2 vols. fol. This is his principal work, and is still a standard book. Wachter was one of the founders of the school of comparative grammar.

WADING BIRDS. [GRALLÆ; GRALLATORES.]

WADHAM COLLEGE, Oxford, was founded by Nicholas Wadham, of Merifield in Somersetshire, in 1612, for a Warden, 15 Fellows, 15 Scholars, 2 Chaplains, and 2 Clerks.

The Fellows are elected from the Scholars, and are superannuated on the completion of eighteen years from the expiration of their regency. The Scholars must be natives of some county of Great Britain, and not have exceeded their nineteenth year at the time of their election; natives of Essex and Somersetshire, and persons of kin to the Founder, if duly qualified, are, in certain cases, entitled to a preference. There are altogether about 20 Exhibitions.

The buildings of this college, the most uniform of any in the university, are comprised in an extensive quadrangle, about 130 feet square, of modern gothic, entered through a gate under a tower. Three sides of this quadrangle contain chambers for the Society and the Warden's lodgings, and on the east side are the Hall and Chapel. The Library and Chapel, extending eastward, form two sides of an inner or garden court.

This college was built upon the site of the ancient house of the Augustine Friars. The Royal Society had its origin in this college, and held its earliest sittings, from 1652 to 1659, in the great room over the gateway.

The number of members on the books of this college in January, 1848, was 323.

WADIES. [ARABIA.]

WAEL, or WAAL, CORNELIUS DE, was born at Antwerp in 1594. He was the son and pupil of John de Wael, a good figure-painter. Cornelius went with his brother Lucas to Genoa, where he was induced to remain, and found employment for sixteen years. He excelled chiefly in land and sea-fights, in which he always introduced a great many excellent figures. He paid three visits to Rome, where, says Soprani, he died in 1662. His best pieces, says Houbraken, were painted for Philip III. of Spain, and for the Duke of Aarschot.

Lucas de Wael was born likewise at Antwerp, in 1591. After he had received some instruction from his father, he studied with John Breughel, and painted many pictures in his style. Lucas lived in Italy with his brother, and painted in Genoa many landscapes both in fresco and in oil. Lucas returned to Antwerp about 1660. Pilkington's 'Dictionary' gives 1676 as the date of his death.

WAFER, a small round piece of dried paste, which is used to fasten letters. The piece of consecrated cake which is given by the Roman Catholic priest in extreme unction is also called a wafer, and thin cake formed into a roll, and called wafers, is still sold by pastrycooks. In fact the word was used in England to signify a thin cake long before wafers for sealing letters were invented. *Waffel* is the name given by the Germans to a thin cake made with flour, eggs, sugar, &c.; the Dutch call such a cake *wafel*, and the Danes *vaffel*. The Anglo-Saxons also had the name *waffel*. By the following extract, given in Peck's 'Desiderata Curiosa,' vol. ii., p. 549, it appears that the thin cake called wafers was given with wine at funeral entertainments:—'1671, Jan. 2, died Mr. Cornelius Bee, bookseller in Little Britain; buried 4 Jan. at St. Bartholomew's, without sermon, without wine or wafers; only gloves and rosemary.'

WAGER. In a wager or bet, two parties stake money against each other on the happening or failure of a certain event: A is to pay a certain sum to B if the event happen one way; and B is to pay a certain sum to A if the event happen the other way. Thus, if John bet Thomas three to one (in pounds) that he will win the game, and it turn out that he does win the game, he (John) is to receive one pound from Thomas; but if John should not win the game, Thomas is to receive three pounds from John.

The principle of a wager exists in a great multitude of transactions which do not bear the name: in fact, every commercial affair in which money is risked upon a possibility of receiving more than legal interest in consideration of that risk is a wager. Thus, if John lend Thomas 100*l.* to engage in an adventure, knowing that he can receive nothing if it fail, and in consideration of 150*l.* if it succeed, it is a wager of the following kind. If the money be out a year, and John could safely make five per cent of it, he risks 105*l.* in case of loss, and is to receive 45*l.* in case of gain; so that in fact it is as if John bet Thomas 105 to 45, that the speculation would succeed.

A wager is fairly laid when the odds are proportional to the probabilities of the event happening or failing. Thus if it be four to one against the happening of an event, the better who bets that it will not happen should offer four to one.

A wager is not fair unless the point in doubt is clearly the same to both parties, and there is no concealed knowledge in the possession of either. The latter is included in the former, as an instance will show. John bets Thomas that the ship Hope is arrived in dock from Jamaica before the time at which the bet is laid; his manner implies that he has formed the conclusion from his knowledge of the time at which the Hope was to sail, of the properties of the vessel, of the prevailing weather, &c.: if his manner tell truth, the wager is fair. Or his manner implies that he may be in possession of particular information, that he may have seen the owner, &c.; it says, 'Mind I do not tell you what my reasons are, all I tell you is the fact:' still the wager is fair. If Thomas dispute, he knows in either case what he disputes, be it the question of the Hope's rate of sailing, or the goodness of John's inference from his particular knowledge. But if John, actually knowing of the Hope's arrival, should lead Thomas into a wager on the probabilities of the ship having arrived, when he knows that it actually has arrived, the wager is unfair. In all matters of skill, indeed, the mere offer of the wager is an assertion of skill, and the acceptance is the denial of this assertion: this is understood, so that there is no occasion for the party who offers the wager to make any declaration of skill, other than is implied in the wager itself.

WAGER. (Law.) [GAMING.]

WAGER-POLICY is a name given to a policy of insurance made by persons having no interest in the event about which they insure. [GAMING.]

WAGES are the price paid for labour, or for services generally. The general rate of wages depends upon the ratio which the capital applied to the employment of labour bears to the number of labourers. If that ratio be great, the competition of capitalists must raise wages; if small, the competition of labourers among each other for employment, must reduce them. Whenever the accumulation of capital is proceeding more rapidly than the increase of population, wages will be on the increase, until some check has been given to the increase of capital, or until the growth of population (which is encouraged by high wages) has altered the relative proportion of capital to labourers, and reduced the rate of wages to the rate which is barely sufficient to enable the receiver of wages to live and bring up children. While the general rate of wages is regulated by these causes, there are various circumstances which, by increasing or decreasing competition for employment, tend to raise or depress the wages paid to persons engaged in particular occupations. Some of the principal of these are—

1. The agreeableness or disagreeableness of the employments.

2. The easiness or cheapness, or the difficulty and expense of learning them.

3. Their constancy or inconstancy.

4. The small or great trust that must be reposed in those who carry them on.

5. The probability or improbability of succeeding in them.

Wages are usually calculated in money, and are called high or low according to the money price actually paid; but the condition of the labourer is affected by the price of commodities as well as by the amount of his wages. If the necessaries of life be cheap, low money wages may maintain him in comfort; if they become dearer, higher wages will not improve his condition, but will leave him as he was. There is no direct relation between wages and the price of provisions and the other necessaries of life; for the rate of wages is fixed, as it has been stated, by other circumstances than the prices of provisions and other necessaries. Yet it cannot be affirmed generally, that if there is a reduction or an increase in this price, which lasts for some time, it will have no effect on the rate of wages. Such effect may be produced not directly by the price of provisions, but by other circumstances which accompany the alteration in price.

When the causes which regulate the price of labour are understood, the folly and injustice of any legislation to fix the rate of wages are obvious. He who has labour to give will always endeavour to obtain high wages, which the hirer will only give if he be unable to obtain it for less. Each will make the best bargain he can, and in this no law ought to restrain him. Experience has long since put an end to any direct legislation in this country on the rate of wages; but the indirect effect of laws upon wages is still felt. The most pernicious interference with wages ever effected by the indirect operation of a law, resulted from the mode of administering the laws for the relief of the poor. [Poor Laws.]

The only sound mode of raising wages and improving the condition of a people is to promote and encourage the increase of the general wealth of a country, by every means which legislative science points out as best suited to that end; and at the same time to remove obstructions, and give facilities to the moral and intellectual improvement of the working classes. By these means capital will be increasing with the natural growth of population; while the labourers, with better habits, will be less prone to reckless improvidence, and consequently not so likely to outrun the increase of capital.

It is not unusual for persons in particular employments to enter into combinations against their masters in order to obtain higher wages. Such combinations were formerly prohibited both by the common and statute law; but since the 5th Geo. IV., c. 95, if unattended with violence or intimidation, they are not unlawful. [Combination Laws.] Strikes, temperately conducted, cannot in principle be condemned: being often a necessary protection to the working classes. When masters are not dealing fairly with their workmen, the fear of a strike may often control them; especially as, when acting unjustly, they would find a difficulty in obtaining new hands. But where the object of a strike or combination is to limit the number of workmen by compulsory regulations, and to dictate to their employers, it is injurious to trade, and ultimately to the parties themselves.

(Adam Smith's *Wealth of Nations;* Malthus, *Essay on Population.*)

WAGTAILS. *Motacillinæ.* [Sylviadæ.] These well-known and graceful little birds appear to be restricted in their distribution to Europe, Asia, and Africa. The species common in England are the Yellow Wagtail (*Budytes Rayi*, Gould); the Gray Wagtail (*Motacilla boarula*, Linn.); the British Pied Wagtail (*Motacilla Yarrellii*, Gould). Several distinct species are continental, and of these some may occasionally visit our island, as the White Wagtail (*Motacilla alba*), which has been confounded with the *M. Yarrellii.* (Gould's 'Birds of Europe;' Yarrell's 'British Birds.')

The following account of the habits of the British Pied Wagtail is generally applicable to all the species. 'It is,' says Mr. Yarrell, 'ever in motion, running with facility by a rapid succession of steps in pursuit of its insect food, moving from place to place by short undulating flights, uttering a cheerful chirping note while on the wing, alighting again on the ground with a sylph-like buoyancy, and a graceful fanning motion of the tail, from which it derives its name. It frequents the vicinity of ponds and streams, moist pastures, and the grass plots of pleasure-grounds; may be frequently seen wading in shallow water, seeking for various aquatic insects or their larvæ: and a portion of a letter sent me lately by W. Rayner, Esq., of Uxbridge, who keeps a variety of birds in a large aviary near his parlour window, for the pleasure of observing their habits, seems to prove that partiality to other prey, besides aquatic insects, has some influence on the constant visits of Wagtails to water;—"I had also, during the summer and autumn of 1837, several Wagtails, the Pied and Yellow, both of which were very expert in catching and feeding on minnows, which were in a fountain in the centre of the aviary. These birds hover over the water, and, as they skim the surface, catch the minnow as it approaches the top of the water in the most dexterous manner; and I was much surprised at the wariness and cunning of some Blackbirds and Thrushes, in watching the Wagtails catch the minnows, and immediately seizing the prize for their own dinner."'

The nest of the British Pied Wagtail is made up of root-fibres, withered grass, and moss; the lining consists of hair and a few feathers. A bank, a hole in some old wall, the thatch of a cart-shed or other farm-building, faggot-piles or woodstacks, and hayricks, are all localities where it is generally placed, and almost always near water.

'While the cows are feeding,' says White, 'in the moist low pastures, broods o wagtails, white and gray, run round them, close up to their noses, and under their very bellies, availing themselves of the flies that settle on their legs, and probably finding worms and larvæ that are roused by the

trampling of their feet. Nature is such an economist, that the most incongruous animals can avail themselves of each other! Interest makes strange friendships.'

The habits of the continental *Motacilla alba* are similar to those of our Pied variety.

WAHLENBE'RGIA, a genus of plants belonging to the natural order *Campanulaceæ*, many of the species embraced in which were formerly included under the genus *Campanula*. The species consist chiefly of herbs, which are for the most part annual. Above fifty species of plants belonging to this genus have been described. They are most abundant in the southern hemisphere, and are particularly numerous at the Cape of Good Hope. The following are a few of the most remarkable forms presented by the species.

W. graminifolia, Grass-Leaved Wahlenbergia, is a native of Sicily and of the south of Italy as far as Rome, and of the island of Zante. *W. Capensis*, Cape Wahlenbergia, with many others of the genus, is a native of the Cape of Good Hope. *W. hederacea*, Ivy-like Wahlenbergia, is a native of the west of Europe and of North America: it is abundant in Great Britain in Cornwall and Sussex, and is also found in Epping Forest. It is also a native of Scotland and Ireland. *W. gracilis*, Weak Wahlenbergia, is a native of Australia about Port Jackson, of Van Diemen's Land, and New Zealand. Four or five varieties of this species have been recorded. *W. Cervicina*, Throatwort, is a small plant, a native of Egypt, and also of Senegal, in dry sandy places. *W. foliosa*, Leafy Wahlenbergia, is one of a group of the species named *Nesophila*, on account of their inhabiting islands. It is found on the islands of St. Helena and Ascension.

WAIF. If the goods of any person were stolen, and the thief, thinking that pursuit was made after him, fled, and during his flight waived or abandoned the goods, they became waif, and were forfeited to the king. The king could grant the right of waif to others; and many lords of manors were entitled to waif by prescription or presumption of an ancient grant to that effect.

It was necessary, in order to complete the title of the king or lord of the manor to waif, that it should be taken possession of by some one on his behalf; otherwise the original owner was not barred from recovering his goods at any time, and if he seized them first, they remained his property.

Lord Coke distinguishes between waif which was stolen property, and the goods which were the property of a person who fled for a felony, which goods were always forfeited on proof and finding by a jury of the fact of flight, even though the party were acquitted of the felony. By 7 & 8 Geo. IV., c. 29, s. 57, the court before whom a prisoner is convicted has power in all cases, without restriction as to time, to make restitution of stolen property to the owner, except as to negociable instruments in the hands of parties who, without notice, have given value for them: and by 7 & 8 Geo. IV., c. 28, s. 5, the jury are no longer to be charged to inquire whether a prisoner fled for treason or felony, and there is now no forfeiture for such flight.

WAIGATZ. [Nova Zembla.]

WAINFLEET. [Lincolnshire.]

WAKE, WILLIAM, D.D., was born in 1657, at Blandford, in Dorsetshire. In 1672 he was admitted a student of Christ Church, Oxford; and having taken his degree of B.A. in 1676, and that of M.A. in 1679, he entered holy orders. In 1685 he was elected preacher to Gray's Inn, London. In 1686 he published a tract in 4to., entitled 'Exposition of the Doctrine of the Church of England,' in answer to Bossuet's recently published 'Exposition of the Roman Catholic Faith.' This tract, which is commonly called 'Wake's Catechism,' gave rise to a long controversy. Immediately after the Revolution he was appointed deputy clerk of the closet to King William; and in June, 1689, he was preferred to a canonry of Christ Church, Oxford, and was created D.D. In 1693 he obtained the rectory of St. James's, Westminster: and the same year he published 'An English Version of the Genuine Epistles of the Apostolical Fathers, with a preliminary Discourse concerning the use of those Fathers.' The next subject in the public discussion of which he engaged was that of the powers of the Convocation; in the controversy respecting which he published a folio volume entitled 'The State of the Church and Clergy of England, in their Councils, Synods, Convocations, Conventions, and other public assemblies, historically deduced from the Conversion of the Saxons to the present times.' In 1701 Wake had been made dean of Exeter, and in 1705 he was raised to the bishopric of Lincoln. In Jan., 1716, he was translated to the archbishopric of Canterbury. Archbishop Wake died at Lambeth, Jan. 24, 1737. He bequeathed his library and his collection of coins, together valued at 10,000*l.*, to Christ Church College, Oxford. A collection of his 'Sermons and Charges,' in 3 vols. 8vo., was published after his death.

WAKEFIELD. [Yorkshire.]

WAKEFIELD, REV. GILBERT, was born Feb. 22, 1756, in the parsonage-house of St. Nicholas of Nottingham, and was the third son of the Rev. George Wakefield, then rector of that parish. His father, who afterwards became vicar of Kingston-upon-Thames, died at Richmond in Surrey, 1770. In his 17th year Gilbert Wakefield was sent to Jesus College, Cambridge, where he applied himself almost exclusively to classical studies. In January, 1776, he took his bachelor's degree, and in the April following he was elected to a fellowship in his college. In March, 1778, he was ordained deacon. From his early years he was attached to the study of theology; but even at the time of his ordination he was dissatisfied, as he says, 'with the requisition of subscription and the subjects of that subscription themselves.' Before the end of 1778 he had the curacy of St. Peter's, in Liverpool, and in the following year he married. At Liverpool he continued his theological studies, and his 'objections to the creed of his forefathers were daily multiplying.'

In August, 1779, on the invitation of the trustees of the dissenting academy at Warrington, he

removed thither to fill the situation of classical master in that establishment. While here he published, in 1781, 'A New Translation of the First Epistle of Paul the Apostle to the Thessalonians,' 8vo. This was followed in the same year by 'A Plain and Short Account of the Nature of Baptism,' 12mo., and an 'Essay on Inspiration,' 8vo. 'A New Translation of the Gospel of St. Matthew,' 4to., appeared in the following year. At Warrington he prosecuted the study of Hebrew, learned Syriac and Chaldee, acquired a perfect knowledge of the Samaritan and Syro-Chaldaic, formed some acquaintance with the Æthiopic, Arabic, and Persian, and read the Coptic version of the New Testament. He remained at Warrington till the academy was broken up in 1783, after it had existed twenty-six years. On this he retired to Bramcoate in Nottinghamshire. While here he published anonymously, at London, a small tract in 12mo., entitled 'Directions for the Student in Theology,' and also the first volume, in 8vo., of his 'Enquiry into the opinions of the Christian Writers of the Three First Centuries concerning the Person of Jesus Christ,' a work which he never carried farther. About the close of 1784 he took up his residence at Nottingham, and he preached occasionally as late at 1786. But from this time he left the established church, and became a bitter assailant of it, although he never joined any body of dissenters. He remained at Nottingham six years and got a few pupils. He was actively employed in writing, and he wrote with great rapidity. Many of his works written at Nottingham were theological, some were political, as 'An Address to the Inhabitants of Nottingham' (on the Test Acts); and 'Cursory Reflections on the Corporation and Test Acts.' In 1790 he left Nottingham to take the place of classical tutor in the dissenting academy at Hackney; but he gave it up in June, 1791, chiefly in consequence of a quarrel with his colleagues.

About the close of 1791 he published, at London, one of his chief works, his 'Translation of the New Testament, with Notes,' in 3 vols. 8vo.; and this was followed by an 'Enquiry into the Expediency and Propriety of Public or Social Worship,' a tract which made some noise. He was now chiefly employed in writing for the booksellers. In 1793 he produced a fourth part of his 'Silva Critica;' and in 1794 an answer to Thomas Paine, under the title of 'An Examination of the Age of Reason;' and a violent attack against the war with France. Shortly after he published an edition of Horace in two volumes, and a selection of Greek Tragedies, in two volumes 8vo. These are only a sample of his varied and multifarious labours. His edition of Lucretius, perhaps his best classical performance, was completed in 1797, in 3 vols. 4to. In January, 1798, appeared 'An Address to the People of Great Britain,' by Watson, bishop of Llandaff, in praise of the war with France. Wakefield immediately wrote a vehement 'Reply to some parts of the Bishop of Llandaff's Address,' which was published by John Cuthell, of Middle Row, Holborn. Cuthell, who knew nothing of the nature of the pamphlet, was indicted for publishing a seditious libel, tried before Lord Kenyon in February, 1799, convicted, and fined. Wakefield repaid Cuthell all the expenses to which he had been put by this unlucky pamphlet. Wakefield was tried at Westminster the same day with Cuthell, and found guilty. He was sentenced by Justice Grose to be imprisoned in Dorchester jail for two years, and to give security for his good behaviour for five years after the expiration of that term, himself in 500*l.*, and two others in 250*l.* each. A subscription was immediately raised for him among the friends of opposition politics, which ultimately amounted to about 5000*l.* He bore with fortitude and good humour his two years' incarceration, which, with the exception of some impositions in money matters by the gaoler, does not appear to have been attended with any unusual hardship. He was released on the 29th of May, 1801; upon which he hurried to London, and commenced a course of lectures on the second book of the 'Æneid,' the delivery of which occupied him till the beginning of July. On the 27th of August he was taken ill of typhus fever, which carried him off on the 9th of September. He left a widow, and four sons and two daughters.

A new edition of Wakefield's Memoirs, in 2 vols., brought down to the close of his life, was published in 1804. The Memoirs will help a reader to form an estimate of his character. As a classical scholar Wakefield's reputation is small. He was too hasty and did too much to do it very well, though he was a most laborious student, and possessed large and varied acquirements. He was obstinate in his opinions, and warm in his temper, at least as it is exhibited in his writings; but he was mild in his manners, an honest man, and highly esteemed by those who knew him well. The present generation will judge more favourably of his political opinions than Justice Grose did; and he was one of those who suffered for the establishment of that liberty of printing which we now enjoy.

WALCHEREN. [ZEALAND.]

WALDECK, a principality in the north of Germany, situated between 51° 4′ and 51° 31′ N. lat., 8° 31′ and 9° 12′ E. long., and lying between Westphalia and Hesse-Darmstadt, has an area of 427 square miles, and a population of 52,000. It is a mountainous country, without any wide valleys. The climate is colder than that of Hesse under the same latitude; but the air is pure and healthy. The soil is in general stony and sterile, yet the industry of the inhabitants raises corn, potatoes, and flax enough for their own use. There is a great quantity of timber; and in some parts of the country there are good pastures, on which numerous herds of cattle are fed, and considerable quantities of butter and cheese are made. Sheep and swine are kept in great numbers. The minerals are copper, iron, lead, alabaster, marble, slate, freestone, and salt. The inhabitants make some coarse woollen cloths and linen for their own use, but none for exportation. The county of Pyrmont belongs to the Prince of Waldeck, who is a member of the German Confederation. [PYRMONT.]

WALDEMAR I., King of Denmark, was the

son of Knut, or Canut, duke of Sleswig, and king of the Obotrites in Mecklenburg, a prince of the first royal dynasty of Denmark. He was born Jan. 15, 1131, eight days after the murder of his father. He began his reign Sept. 22, 1157. Rügen, Mecklenburg, and the most western part of Pomerania were compelled to recognise the Danish king as their sovereign, and Waldemar did homage for his conquests to the Emperor Frederic I. Waldemar also acquired the southern part of Norway. He died May 12, 1181.

WALDEMAR II. was the second son of Waldemar I., King of Denmark. He began his reign in 1203. He subdued Esthonia, Livonia, and Kurland, and was afterwards acknowledged as king of the Slavonians or Wends. Soon afterwards Henry, count of Schwerin, who had some cause of complaint against the king, treacherously seized him in the island of Laaland, took him on board a vessel, and carried him to Schwerin. It was only through the mediation of the Pope that Waldemar was released in 1225, on condition of paying 45,000 marks of silver, ceding Holstein to its legal possessor Count Adolphus IV., and renouncing the sovereignty of Mecklenburg. No sooner was Waldemar restored to liberty, than he aimed at recovering those provinces which he had ceded. But in the battle of Bornhövd the Danish army was totally routed by the united forces of Lübeck, Holstein, and some neighbouring princes. He concluded peace in 1229. He renewed the war with Lübeck in 1234, but his navy was destroyed, and he was compelled to grant privileges to this town, which soon became known as the head of the Hanseatic confederation. Waldemar died March 28, 1241.

WALDEMAR III. (IV.) was the son of King Christopher, who was deposed and banished in 1326. He began his reign in 1340. Waldemar III. died in 1373. He was the last of the first Danish dynasty, which had ruled in Denmark from the beginning of Danish history.

WALDENSES. [Vaudois.]

WALES, a principality of Great Britain, lies on the west side of the island, between 51° 20′ and 53° 25′ N. lat., and 2° 41′ and 5° 18′ W. long. It is bounded W. and N. by St. George's Channel, E. by Cheshire, Shropshire, Herefordshire, and Monmouthshire, and S. and S.E. by the Bristol Channel. Its greatest length N. to S. is about 180 miles; its breadth E. to W. varies from 50 to 80 miles. It contains 7426 square miles. A general description of the surface is given under Great Britain, vi., 824. The counties are described under their respective names, and the area and population of each county are given under Great Britain, vi., 828.

The origin of the names Wales and Welsh is uncertain. Taliesin, a Welsh bard of the sixth century, styles his own country Wallia. The term Cambria, another and frequent name for Wales, is probably derived from Cymri, one of the two great families into which the Celtæ appear to have been divided.

The history of the island of Great Britain to and during the period of the Roman domination is given in the article Britannia.

After the Romans had left Great Britain, the Cambro-Britons were driven back by the Saxon races into the mountainous districts of Wales, where, under a variety of princes, they were engaged in almost constant warfare with the Angles of Bernicia, Deira, and Mercia; the Saxons of Wessex; and the Gwizzelians of Ireland.

Towards the end of the 8th century the Mercians succeeded in driving the Welsh from the border territory, and Offa, king of Mercia, made an artificial boundary from the mouth of the river Dee on the north to the river Wye on the south, known by the name of Clawdd Offa, or Offa's Dyke, traces of which are still to be found along a great part of the line. With this exception, no permanent footing was gained in Wales, though Egbert, king of Wessex, gained some important victories in 828, and penetrated as far as Snowdon; but the incursions of the Danes, by calling away the Saxons, left the country for some time in tranquillity. Roderic, who had acquired the sovereignty of nearly all Wales, in 843 divided his dominions into three principalities, to which his three sons succeeded. One of these principalities was called Gwynedd, and corresponded nearly to the present North Wales; another, Ceredigion and Dyved, or South Wales; and the third Powys, comprising parts of Montgomeryshire, Shropshire, and Radnorshire. Other smaller tracts were occupied by various princes.

In the 10th century an annual tribute of money was imposed on the Welsh, by Athelstan, king of England, who had obtained the nominal dominion of Wales. On the accession of William the Conqueror, the Welsh refused to pay tribute. The Norman conqueror invaded their country with a considerable army, reduced them to submission, and compelled their princes to do homage and take an oath of allegiance as his vassals.

But the conquest of Wales was far from complete. William the Conqueror and his successors made grants to their dependents of such lands as they might conquer in Wales, and thus by degrees the greater part of South Wales and Powis came into the possession of the English. North Wales however was not conquered till the reign of Edward I., when Llewellyn, prince of North Wales, having refused to do homage to the King of England, Edward invaded Wales, and forced Llewellyn to sue for peace in 1277. In 1281 Llewellyn again rose in arms against the English, but was conquered by Edward I., and was himself slain Dec. 11, 1782. His surviving brother, Prince David, who succeeded him in the principality, was soon after executed at Shrewsbury as a traitor. A massacre of the Welsh bards by Edward's orders soon followed. The nobility of Wales submitted to the conqueror, and by the statute of Rothelan, passed in the 12th year of Edward's reign, Wales was incorporated and united with England. The title of Prince of Wales was bestowed by Edward upon his son, afterwards Edward II., and has ever since been the title conferred on the King or Queen of England's eldest son.

By the statute of Rothelan (12 Edward I.,

c. 5) a part of Wales was formed into the counties of Anglesey, Caernarvon, Merioneth, and Flint; and by a statute passed in the 27th year of the reign of Henry VIII., various lordships in the Marches were united to English or Welsh counties, and the remainder were divided into the new counties of Monmouth, Brecknock, Radnor, Montgomery, and Denbigh. By the 2 Wm. IV., c. 45 (Reform Act), Wales returns 29 members to parliament: viz., 2 each for the counties of Caermarthen, Denbigh, and Glamorgan; 1 each for the counties of Anglesey, Brecon, Cardigan, Caernarvon, Flint, Merioneth, Montgomery, Pembroke, and Radnor; 1 each for the boroughs of Brecon and Merthyr Tydvil; and 1 each for the several districts of boroughs, of which the principal or returning boroughs are Beaumaris, Caermarthen, Cardigan, Caernarvon, Denbigh, Flint, Cardiff, Swansea, Montgomery, Pembroke, Haverfordwest, and Radnor.

Since the passing of the 11 Geo. IV. and 1 Wm. IV., c. 70, Wales has no jurisdiction in legal matters distinct from England. It is divided into two circuits—North Wales and South Wales, and one judge travels each. North Wales includes Anglesey, Caernarvonshire, Denbighshire, Flintshire, Merionethshire, and Montgomeryshire. South Wales includes Brecknockshire, Cardiganshire, Caermarthenshire, Glamorganshire, Pembrokeshire, and Radnorshire.

It contains four bishoprics—those of Bangor and St. Asaph in North Wales, and of St. David's and Llandaff in South Wales. The boundaries however of the Welsh and English bishoprics adjoining are not determined by any reference to the boundaries of the principality, any more than they are by the divisions of counties.

The inhabitants of Wales are chiefly engaged in agriculture. The farms are generally small, and more than one-half of them are cultivated by the occupiers without the assistance of labourers. The annual value of real property in 1843 was 3,465,718*l.*

The principal manufacture in Wales is that of iron, and this is chiefly confined to Glamorganshire. Large quantities of ore are raised in that county, where the most extensive smelting-furnaces in the Empire are to be met with. In 1840 South Wales had 132 furnaces in operation, which consumed during the year about 1,436,000 tons of coal, and produced 505,000 tons of iron. North Wales had 12 furnaces, which consumed about 110,000 tons of coal, and produced 26,500 tons of iron. In 1847 the total quantity produced in Wales was 884,000 tons. The principal iron-works are at and around Merthyr-Tydvil, Tredegar, Aberdare, and Ruabon.

Copper-ore, brought from Cornwall and other parts of England, from Ireland, and foreign countries, is smelted in large quantities at Swansea. The average quantity of ore smelted there in 16 years (1833 to 1848), was 194,142 tons; the average quantity of copper produced was 18,567 tons.

The great coal-field of South Wales affords employment to a number of hands. The quantity of coal exported at the different ports of South Wales and Monmouthshire in 1848 was nearly two million tons. North Wales also yields some coal and iron, from the vicinities of Wrexham and Ruabon in Denbighshire. Lead (with some silver-ore) and copper are raised in Anglesey, Cardiganshire, and other parts of Wales, as well as large quantities of slate, limestone, and marble. Various manufactures in lead, iron, copper, and brass are carried on at Holywell in Flintshire. Flannel in considerable quantities, coarse cloth, and stockings are manufactured in Montgomeryshire and other parts of North Wales.

WALES, NEW SOUTH, a colony belonging to Great Britain, in its widest acceptation comprises all the E. portion of Australia, S. of 26° S. lat., and E. of 141° E. long. It thus includes Cook's Land (Moreton Bay), the N. boundary of which is yet undetermined, and the colony of Victoria (Port Phillip), established by the Act 13 & 14 Vict., c. 59 (Aug. 5, 1850). It is bounded W. by the colony of South Australia. The length N. to S. is about 900 miles, and the average width about 630 miles, which gives an area of 567,000 square miles. The estimated area of the settled portions is 54,000 square miles. The population, Dec., 1848, including Cook's Land, the colony of Victoria, and the squatting districts, was 220,474, of whom 4015 were convicts.

The physical geography, geology, general productions, aboriginal inhabitants, zoology, and botany, of New South Wales, are described in the article AUSTRALIA. It only remains to give a few details in addition to what is there stated.

The larger rivers which drain the country between the coast-range of mountains and the Pacific have water all the year round. They generally flow in beds which are deeply depressed below the common level of the country, and between banks which rise perpendicularly, or nearly so, from 100 to 200 feet, and frequently higher, so that the streams are inaccessible, except at a few places. This peculiar construction of the channels in which the rivers run renders it impossible to use their water for irrigating the adjacent fields without expensive machinery. These rivers are also of little avail as channels for the transport of the produce of the country, as they are only navigable to a short distance from their mouths, above which their current is frequently broken by rapids and cataracts, which indeed are neither long nor high, but their frequency renders navigation impossible even by small boats.

Of these coast-range rivers the most southern is the Shoalhaven, which flows N. about 90 miles, and then E. about 40 miles to the Pacific. The Hawkesbury has a rapid course of about 250 miles, and falls into Broken Bay by an æstuary. George's River has a course of about 60 miles, and falls into Botany Bay. The Hunter River, after a course of about 200 miles, falls into Port Hunter. The principal affluent of the Hunter is the Goulbourn, which has a very winding course of about 200 miles. The other rivers which drain the lands north of the Hunter are the Manning, Hastings, Clarence, and Brisbane. The only river worth notice which falls into the southern sea is the Glenelg, which, after a course

of about 200 miles W., S.W., and S., falls into the sea near the boundary of South Australia.

All the rivers which drain the interior of New South Wales, as far as it is known, appear to belong to one river system, whose basin probably contains an area of not less than 500,000 square miles. It is called the river-basin of the Murray, not from the river which has the longest course, but from that which contains the greatest volume of water. Of the affluents of the Murray, one of the largest is the Darling, the upper branches of which drain the country extending from 27° to 30° S. lat. The Darling receives the Condamine, the Gwydir, the Peel, the Castlereagh, the Bogan, and other rivers, and enters the Murray near 34° S. lat., 142° E. long. It has very little water in dry seasons, and is generally fordable. The waters which descend from the western slope of the Blue Mountains are collected chiefly into two rivers, the Macquarrie and the Lachlan. The Macquarrie originates to the north of 34° S. lat., and flows N.W. It receives the Cudegong and the Erskine, and after a course of about 250 miles, is lost in extensive marshes. The Lachlan is formed by several streams which fall from the western slopes of the Blue Mountains. It receives a great number of streams as it flows N.W. and S.W. about 500 miles, and joins the Morumbidgee, 34° 30′ S. lat., 144° 10′ E. long. The bed of the Lachlan is often dry, and sometimes is lost in marshes before it reaches the Morumbidgee. The Morumbidgee, or Murrumbidgee, runs W. about 350 miles to the junction with the Lachlan, and after running W. and S.W. about 100 miles more, is joined by the Millewa, a large river, which is also called the Murray, and the united stream is then called the Murray. The Murray runs W. about 100 miles, and is then joined by the Darling, and passing 141° E. long., turns S., and empties itself into Lake Victoria, near Encounter Bay. [South Australia.]

In 1848 the imports into New South Wales were valued at 1,556,550*l.*, the exports at 1,830,368*l.* The shipping inwards amounted to 199,304 tons; outwards, to 187,322 tons. The wool exported was 22,969,711 lbs., valued at 1,240,144*l.* The gross revenue was 551,246*l.*; the gross expenditure was 583,089*l.* On Jan. 1, 1849, the total number of sheep was 11,660,819; of cattle, 1,752,852; of horses, 113,895; of pigs, 70,875. The produce of wheat was 1,528,874 bushels; of maize, 262,340 bushels; of barley, 145,219 bushels; of oats, 116,634 bushels; of potatoes, 14,954 tons; of tobacco, 3059 cwts.; of hay, 37,795 tons; of wine, 103,106 gallons; of brandy, 1263 gallons.

New South Wales, exclusive of the colony of Victoria, is divided into 37 counties, 16 of which were added in 1848. The capital is *Sydney.* [Sydney.] *Bathurst,* 98 miles W.N.W. from Sydney, is a prosperous town in a grazing district, on the banks of the Macquarrie. *Brisbane,* a thriving settlement, is situated on the river Brisbane, 10 miles from the mouth. *Liverpool,* about 16 miles W. from Sydney, is situated on the left bank of George's River. It has a considerable retail trade, as the country south of it is very fertile and well cultivated. *Maitland,* 15 miles N.W. from Newcastle, stands on the south bank of the Hunter River, at the junction of the Wallis Creek. There are two towns, East Maitland and West Maitland, the united population of which in 1846 was 3319. In East Maitland are a court-house and gaol, and in West Maitland numerous stores and some good hotels. Coal is abundant in the neighbourhood. *Newcastle* is built at the mouth of the Hunter River, about 70 miles N. by E. from Sydney, direct distance. It stands on the declivity of a hill of moderate elevation, which is united to the mainland by a low swampy neck of ground. It depends chiefly on the coal-mines in the neighbourhood. *Paramatta,* 13 miles W.N.W. from Sydney, stands on the small river Paramatta, which falls into Port Jackson. It has daily communication by steam-boats with Sydney. The population in 1846 was 4454. *Windsor,* 30 miles N.W. from Sydney, stands on the southern bank of the Hawkesbury. The river is navigable to 4 miles above Windsor. The population in 1846 was 1679. There are bishops of Sydney and Newcastle.

The *Colony of Victoria* is separated on the N. from the present colony of New South Wales chiefly by the rivers Morumbidgee and Murray, and thus extends from about 34° S. lat. to Wilson's Promontory in Bass's Strait, or 39° S. lat. It extends W. from South Australia, or 141° E. long., to the Pacific, about 150° E. long. The estimated area is 80,000 square miles. The estimated population in 1850 was 60,000. The chief towns are Geelong, Melbourne, and Portland. *Geelong* is situated at the head of Geelong Bay in Port Philip, 40 miles S.W. from Melbourne, with which it has regular communication by steam-boats. The population in 1846 was 2065. *Melbourne,* the capital of the colony of Victoria, is situated on the Yarra-yarra, 4 miles from its mouth in Port Philip, in 37° 48′ S. lat., 144° 57′ E. long. The town was founded in 1837, and in 1846 had a population of 10,954. It contains a court-house, gaol, theatre, government-offices, and several churches. It is the chief seat of the trade of Victoria. Vessels of 200 tons burthen can go up to Melbourne, but larger vessels lie opposite Williamstown, at the mouth of the river. There is a bishop of Melbourne. *Portland,* 170 miles W.S.W. from Melbourne, is situated on Portland Bay, and is a place of active and increasing trade.

By the 13 & 14 Vict., c. 39, 'An Act for the better Government of her Majesty's Australian Colonies,' the District of Port Philip is erected into the Colony of Victoria, and after the separation New South Wales and Victoria are each placed under the authority of a Governor, Legislative Council, and Executive Council; and the laws are administered in each colony by a Chief Justice, two Puisne Judges in New South Wales and one in Victoria, an Attorney-General, and a Solicitor-General.

WALES, PRINCE OF, is the title usually borne by the eldest son or heir apparent of the King or Queen Regnant of Great Britain and Ireland. Before the reign of Edward I. the eldest son of the King was called the Lord

Prince. The title of Princes of Wales originally distinguished the native princes of that country. Edward I. conquered, in 1277, Llewellyn and David, the last native Princes of Wales, and united the kingdom of Wales with the crown of England; and he invested with the principality his son, Edward of Caernarvon, then an infant, and caused the barons and great men to do him homage. Edward was not at that time the king's eldest son, but on the death of his brother Alphonso, he became heir apparent, and from that time the title of Prince of Wales has ever been borne by the eldest son of the king. The title is conferred by special creation and investiture.

The eldest son of the king or queen regnant is by inheritance Duke of Cornwall. The titles of the Prince of Wales are 'Prince of Wales and Earl of Chester, Duke of Saxony, Duke of Cornwall and Rothsay, Earl of Carrick, Baron of Renfrew, Lord of the Isles, Great Steward of Scotland.'

WALES, WILLIAM, a mathematician and astronomer, was born about the year 1734, of parents in humble circumstances.

He first distinguished himself as a contributor to the 'Ladies' Diary. The merit shown in his solutions of propositions in that work appears to have procured for him a recommendation to the government; and in 1768 he was appointed, together with Mr. Dymond, to go to Hudson's Bay, for the purpose of observing in that region the transit of Venus over the sun's disk, which was to take place in the following year (June, 1769). Mr. Wales returned to England in 1770, and in 1772 he published an account of his astronomical observations at Hudson's Bay. In the same year he published 'The two books of Apollonius concerning Determinate Sections,' London, 4to. In the same year he was appointed, together with Mr. Bayley, to accompany Captain Cook in his second voyage for the circumnavigation of the earth; and on his return with the expedition he was (in 1776) elected a fellow of the Royal Society. In the same year he again embarked with Captain Cook in the Resolution, on the third voyage of that navigator to the Pacific Ocean; and soon after his return he was (1780) appointed mathematical master of Christ's Hospital. He was subsequently made secretary to the Board of Longitude; and both these posts he held till his death. In 1794 he published his tract entitled 'The Method of Finding the Longitude by Timekeepers.' He died in 1798.

WALKER, ROBERT, an English portrait painter, contemporary with Vandyck, and the principal painter employed by Cromwell. Walker painted several portraits of Cromwell, and those of most of his officers, military and naval. One of these portraits of Cromwell is now in the Pitti Palace at Florence.

Walker had for some time apartments in Arundel House: he died a little before the Restoration. There is a portrait of him by himself in the picture-gallery at Oxford, and there was another at Leicester House: there is also a good print of Walker, holding a drawing, by Lombart.

WALKER, JOHN, was born at Colneyhatch, Middlesex, March 18, 1732. He was an actor until 1767, when he quitted the stage, and joined Mr. James Usher in establishing a school at Kensington Gravel-pits. This partnership lasted about two years, after which Walker set up for himself as a teacher of elocution, and gave lectures in different parts of England. The settlement of the pronunciation of the English language was an object to which he devoted a great part of his attention. Walker was brought up a Presbyterian, but in his latter days he became a very strict Roman Catholic. He died in Aug., 1807. The work by which he is best known, his 'Critical Pronouncing Dictionary and Expositor of the English Language,' was first published in 1791, and there have since been many editions of it. His latest publication was 'Outlines of English Grammar.'

WALKE'RA, a genus of plants named after Richard Walker, D.D., who was founder of the botanic garden at Cambridge. It belongs to the natural order *Ochnaceæ*. It is a native of Malabar and Ceylon, and has yellowish flowers and reddish fruit. The roots and leaves are very bitter. *W. integrifolia* is a native of French Guiana.

WALL-CREEPER. [Creeper.]

WALL-CRESS, the common name of the plants belonging to *Arabis*, an extensive genus in the natural order *Cruciferæ*. Nearly seventy species of this genus have been described. They are most of them small plants, fond of growing in dry stony places and on walls, and hence their English name Wall-Cress. Several of the species are natives of Great Britain, and many of them are cultivated in gardens on rock-work and flower-borders, on account of their blooming early in spring.

WALL-FLOWER, the common name of the species of *Cheiranthus*, a genus belonging to the natural order *Cruciferæ*. Many of the species exhale a delicious odour, and are great favourites in gardens. The most plentiful is the *Cheiranthus Cheiri*, the Common Wall-Flower, which is found wild throughout Eurape, on old walls and in stony places. The general colour is a brown yellow, or, as a poet has called it, the 'yellow wall-flower stained with iron-brown.' It is however subject to considerable varieties of colour even in its wild state, and these are much increased by cultivation. On account of its scent, it has been transferred from ruined walls to the flower-borders of gardens, and there, by the doubling of its flowers, and the variations of its colours, a number of distinct varieties have been produced.

Several other species of this genus have been described, and are occasionally found in collections in gardens in this country. In their cultivation, the hardy shrubby species, such as the common wall-flower, may be propagated by cuttings, which soon strike root when planted under a hand-glass. Other perennial species will permit of growth by dividing the roots. The annual species may be sown in the open border or on rock-work, where they will flourish, and most of them will survive the winter in such a situation.

WALL-PELLITORY, the common name of the *Parietaria officinalis*, a plant belonging to the natural order *Urticaceæ*. *P. officinalis*, Wall-Pellitory, is common throughout Europe, and is

found in Great Britain on old walls and in waste places among rubbish. The stems of the plant are often procumbent upon the wall on which it grows, and are of a reddish colour. The flowers are small, hairy, of a purplish green colour, and clustered in the axils of the leaves. The leaves are furnished with minute hairs, which under some circumstances have a stinging power, similar to many plants of the order to which they belong.

WALL-RUE. [ASPLENIUM.]

WALLACE, SIR WILLIAM. The life and exploits of this most popular national hero of Scotland have been principally preserved by poetry and tradition. There are contradictory statements of the year of his birth, but it is probable that he was born about 1270. He is said to have been the younger of the two sons of Sir Malcolm Wallace of Elderslie and Auchinbothie, in the neighbourhood of Paisley.

The history of Wallace down to 1297 is only to be found in the rhymes of Harry the Minstrel, who professes to translate from a Latin account written by Wallace's chaplain, John Blair. His first memorable act is said to have been the slaughter of the son of Selby, the English governor of the castle of Dundee, in chastisement of an insult: Wallace struck him dead with his dagger on the spot. He then took to the woods, and soon found himself at the head of a band of attached followers, who harassed the English soldiery, plundering and slaying with equally little remorse. It seems probable that the guerilla warfare maintained by Wallace and his associates aided materially in producing the insurrection which broke out in the spring of 1297. The accounts we have of its commencement represent Wallace at its head, in command of a considerable force, and in association with some of the most distinguished persons in the kingdom. This however appears to have been but an ill-cemented confederacy. Dissensions took place between the leaders, and ultimately all agreed, with the exception of Wallace and his friend Sir Andrew Moray of Bothwell, to acknowledge Edward as their king. The treaty of Irvine having been concluded, Wallace retired to the north, carrying with him however a body of adherents, to whom additional numbers gathered, so that he soon found himself in a condition to recommence aggressive operations. The complete defeat and rout of the English at the battle of Stirling Bridge, Sept. 11, 1297, for the moment liberated Scotland. The English were driven or fled from every place of strength in the country.

Availing himself of this panic Wallace pursued the fugitives across the border. He entered England Oct. 18, remaining till Nov. 11, wasting the country with fire and sword from sea to sea, and as far south as to the walls of Newcastle.

After his return Wallace assumed the title of Guardian of the Kingdom in the name of King John (John Baliol, then living in a sort of free custody in the Tower of London). But this elevation did not last long. The energetic English king, who had been abroad, had now returned home, and was already on his march towards the borders. The two main armies met July 22, 1298, in the neighbourhood of Falkirk, the Scots being commanded by Wallace, the English by King Edward in person. The Scots, after a gallant resistance, were defeated with immense slaughter.

This defeat did not put an end to the war; and it was taken advantage of by the Scottish nobility to deprive Wallace of his office of guardian or chief governor of the kingdom. For some years after this our accounts of Wallace are slight and obscure; but he appears to have returned to the practice of desultory warfare. The next well-ascertained fact regarding him is, that when the Scottish leaders were at last obliged once more to submit to Edward at Strathorde, Feb. 9, 1304, Wallace was not included in the capitulation. He was soon after summoned to appear before a parliament or convention of Scotch and English nobility, held at St. Andrews; and, upon their not presenting themselves, he and Sir Simon Frisel or Fraser were pronounced outlaws. For some time his retreat remained undiscovered, and how he was actually taken is not known. He was soon however brought to London, and having been condemned as a traitor in Westminster Hall, was dragged to the Elms in West Smithfield, and there hanged on a high gallows, Aug. 23, 1305, under circumstances of great barbarity.

WALLACE, WILLIAM, was born Sept. 23, 1768, at Dysart, in Fifeshire, where his father was a manufacturer of leather. Having been bound apprentice to a bookbinder in Edinburgh, he found means to purchase some mathematical works, from which, before he was twenty years of age, he acquired some knowledge of geometry and trigonometry, algebra with fluxions, conic sections, and astronomy. About this time he obtained introductions to Dr. Robison and Professor Playfair, the former of whom allowed him to attend his lectures on Natural Philosophy, and the latter contributed both by advice and by loans of books to facilitate his progress in acquiring a knowledge of the higher branches of mathematics.

In the hope of obtaining more time for the prosecution of his studies, Wallace quitted the calling for exercising which he had qualified himself, and became a warehouseman in a printing-office. While engaged in this employment he acquired, with the assistance of a student in the university, a knowledge of Latin. He subsequently became a shopman to one of the principal booksellers of Edinburgh, and while holding this situation he gave lessons occasionally in the evenings in mathematics. In 1794 he was appointed assistant teacher of mathematics in the Academy at Perth, and soon afterwards he married.

Mr. Wallace continued to fulfil the duties of his appointment at Perth during nine years; but in 1803 he was appointed to the post of a mathematical master in the Royal Military College, which had then recently been formed at Great Marlow, in Buckinghamshire, and both there and at Sandhurst, in Berkshire, to which last place the institution was afterwards removed, he performed the duties of his post greatly to the satisfaction of the persons in authority.

In the following year the appointment of Mr.

(Sir John) Leslie to succeed Professor Playfair on the death of the latter, left a vacancy in the chair of Mathematics at Edinburgh, and Mr. Wallace immediately became a candidate for the post. He was elected, and he held the appointment till 1838, when he resigned it on account of ill health. On this occasion the university conferred on him the honorary title of LL.D., and he received from government a pension in consideration of his attainments in science. He died at Edinburgh, April 28, 1843, in the 75th year of his age, after an illness which for several years had prevented him from entering into society. He had been a Fellow of the Royal Astronomical Society from the time of its formation; he was also a Fellow of the Royal Society of Edinburgh; and a member of other learned societies.

In 1796 he presented to the Royal Society of Edinburgh his first paper, which was entitled 'Geometrical Porisms;' and about the same time he contributed the article 'Porism' to the third edition of the 'Encyclopædia Britannica.'

In 1802 he presented to the Royal Society of Edinburgh a paper containing a new method of expressing the co-efficients in the development of the formula which represents the mutual perturbation of two planets. Six years afterwards he presented to the same society a third paper, entitled 'New Series for the Quadrature of the Conic Sections, and the Computation of Logarithms;' and in 1823 he presented a paper on the 'Investigation of Formulæ for finding the Logarithms of Trigonometrical Quantities from one another.' In 1839 he gave a paper on the 'Analogous Properties of Elliptic and Hyperbolic Sectors;' and his last contribution to the society was one entitled 'Solution of a Functional Equation, with its Application to the Parallelogram of Forces, and the Curve of Equilibration.'

Mr. Wallace contributed to the 'Transactions of the Royal Astronomical Society' a paper entitled 'Two Elementary Solutions of Kepler's Problem by the Angular Calculus,' which is published in the volume for 1836.

In his early life Mr. Wallace was a contributor to Leybourne's 'Mathematical Repository,' and 'The Gentleman's Mathematical Companion;' he also wrote the principal mathematical articles for the 'Edinburgh Encyclopædia,' and for the fourth edition of the 'Encyclopædia Britannica.'

WALLACHIA, or WALA'CHIA, a principality under the sovereignty of Turkey and the protection of Russia, consists of the southern slope of the Carpathian Mountains, and the plain that lies between their base and the left bank of the Danube. It is bounded N. by Transylvania and Moldavia, E., S., and S.W. by the Danube, and W. by Hungary. Its greatest length from W. to E. is 270 miles, and from S. to N. 127 miles. The area is about 31,000 square miles, and the population is 2,324,484.

The Carpathians are the principal mountains. [TRANSYLVANIA.] Several lower and parallel ranges stretch from the main chain in a southern direction, inclosing valleys, the upper parts of which are narrow, but the lower parts become wider as the valleys approach the Danube. Along this river there is a broad level tract consisting of lowlands and marshes, which are exposed to the inundations of the river. In the western part of Wallachia however the hills reach to the banks of the Danube. A great part of the country is covered with forests of firs, oaks, and beeches. The soil, except in the mountainous districts, is a rich mould of extraordinary fertility. In the highlands there are extensive sheep pastures. In the level and marshy parts there is excellent pasture for cattle, of which great numbers are annually fattened. The principal rivers are the DANUBE and its feeders, springing out of the southern Carpathians; the chief of them are—the *Syll* or *Shyl*, which flows through the Valkan Pass, and joins the Danube opposite the town of Rahova: the *Alt* or *Aluta* [TRANSYLVANIA]: the *Telorman*, which enters the Danube opposite the town of Novograd, after a course of 100 miles: the *Arjis*, *Argis*, or *Arj*, which rises 20 miles E. of the Rothenthurm Pass, and joins the Danube opposite the Bulgarian town of Turtuki: the *Dumbowitza*, a tributary of the Arjis: the *Janolitza*, which comes from the Carpathians near the Tomosh Pass, runs first S. for 30 miles, and afterwards S.E.E. and N.E. till it reaches the Danube a little below Hirsowa: and the *Boza* or *Bouza*, which comes from Transylvania, through the Boza Pass, and joins the Sereth, a Moldavian river, 12 miles above its junction with the Danube. All these rivers are navigable for barges, but little is done to facilitate the navigation, which is rendered impracticable in many places by rocks, shallows, and other obstacles.

The summers are exceedingly hot and the winters very cold; but the climate is healthy, except in the marshes, where fevers prevail during the warmer months. The waters are abundantly supplied with fish. The mineral productions are iron, copper, lead, silver, and gold, of which a considerable quantity is found in the sand of the rivers. The only mines worked are those of rock-salt, of which great quantities are got near Slanikul, and especially near Okna-Teleaga. Wallachia produces abundantly wheat, maize, barley, oats, rye, millet, hemp, tobacco, and other productions of southern Europe. The vine grows well, and the produce is excellent. The *Rhamnus infectorius* yields annually 600,000 okas of seed, which is exported to Transylvania, and is used for dyeing cloth. There is abundance of game of every description. The timber is good and abundant, but it rots in the forests. The principal occupations of the people are agriculture and pasturage. Horses, horned cattle, sheep, goats, and swine, are very numerous. Oxen are used in ploughing, in waggons, and for treading out the corn, which is commonly stored in pits. The commerce has considerably improved of late years. The exports are cattle, corn, wool, hides, tallow, wine, and other products; the imports are manufactured goods, coffee, sugar, spices, &c. The native manufactures are coarse, and only for the home consumption. The principal port is Braïlov. The line of steamers established between Vienna and Constantinople has put Wallachia in direct communication with both these capitals.

Towns.—BUCHAREST is the capital. *Tergovist* (*Turguvici*), N.W. of Bucharest, on the Jalonitza, contains about 5000 inhabitants; the road from Bucharest, to Kronstadt in Transylvania, passes through Tergovist. *Ghiurgewo* (*Giurgevo*), on the Danube, opposite Rustshuk, was formerly a strong fortress, but the fortifications were razed in accordance with an article of the peace of 1829. *Krajova* or *Krayowa*, a fine town with about 8000 inhabitants, has considerable commerce; it is situated on the Shyl, in the centre of Little Wallachia, which lies between the Aluta, Hungary, and the Danube. *Braïlov* (*Ibraïla*), on the Danube, 10 miles south of the junction of the Sereth with the Danube, in the north-eastern corner of Wallachia, was formerly one of the strongest fortresses on the Danube. It sustained many sieges against the Russians, who have taken it several times. The port of Braïlov, which admits vessels of 600 tons and upwards, is well frequented by foreign vessels. In 1840, 678 vessels arrived with cargoes valued at 103,176*l.*, and 649 departed with cargoes to the amount of 349,575*l.*; since then the import and export trade are said to have much increased. Wallachian produce is brought to Braïlov in lighters, great numbers of which are built by the Wallachians, Servians, and Turks. The population of Braïlov exceeds 25,000. *Rômnic* lies W. of Braïlov. In its vicinity is *Okna-Mare*, where there are rich mines of rock-salt. The great road from Yassy to Bucharest leads through Rômnic.

The great bulk of the inhabitants are Wallachians, who call themselves *Rumani* or Romans, and are said to be a mixed race descended from Roman colonists and a Sclavonic tribe. In consequence of the oppression of the Greek emperors the Vlachi, Wallachs, or Wallachians left Thrace in the 12th century, and settled north of the Danube. The name Wallachs is said to be merely a corruption of the Sclavonic term *Wloch*, which means Roman or Italian. The language of the Wallachians is derived chiefly from Latin, but has a mixture of Greek, Gothic, and Sclavonic words. This race prevails also in Moldavia, and there are large numbers of Wallachs in Transylvania, south Hungary, and Russia. They are said to have belonged to the Greek Church before their migration from Thrace, and to this religion they still adhere.

In the 13th and 14th centuries the Wallachians were partially subjected by the Hungarians; at the commencement of the 15th century they were forced to pay tribute to the Turks, but still enjoyed the free exercise of their own laws, the voiwodes, or rulers, being chosen by the metropolitan, the bishops, and the boyards, and the independence of their territories being secured by treaties. From the beginning of the 18th century, the Porte, which previously merely confirmed the election of the voiwode, claimed the right of naming him, and from this period to the late war with Russia, the office was conferred for money on Greeks of Constantinople. By the treaty of 1829, between Russia and Turkey, the right of confirming the election of the Hospodar is given to both these powers; but a small tribute is still guaranteed to Turkey. The first Hospodar, Alexander Ghika, named in 1834, laid down his power in 1842. George Bibesco succeeded, but disappointed the party who elected him; an insurrection broke out in Bucharest (June 23, 1848), and the prince was forced to accept a ministry composed of the insurgent leaders, but immediately after resigned. A provisional government, of which the metropolitan was the chief, was then appointed, and recognised by the exertions of Suleyman Pacha, the commissioner of the Porte. The Pacha was recalled by the Porte, and was succeeded by Fuad-Effendi; but the provisional government lasted till the occupation of Bucharest by Ottoman troops, in Sept., 1848. After long negociations between the Porte and the Czar, the Act of Balta-Liman was signed May 1, 1849, in accordance with which, Dimitri Barbo Stirbey, the brother of Prince Bibesco, was appointed Hospodar for a period of seven years.

WALLENSTEIN. *Albrecht Wenzel Eusebius, Duke of Mecklenburg, Friedland, and Sagan, Count of Waldstein*, commonly called *Wallenstein*, was the third son of Wilhelm baron von Waldstein. He was born in his father's castle of Hermanic, in Bohemia, Sept. 15, 1583. The family of Waldstein had belonged to the high nobility (Herrenstand) of Bohemia from the 13th century. He lost his mother in 1593, and his father in 1595, and, although a younger son, he inherited considerable estates. The family of Waldstein belonged to the established Protestant church of Bohemia; but Albrecht's uncle and guardian was a Roman Catholic, and placed his ward under the Jesuits at Olmütz, who speedily converted him. He continued his studies at Pavia and Bologna, where he acquired a knowledge of the ancient and of many European languages; of law; of mathematics and other sciences connected with the military art; and a taste for astrology, in which he always believed, and in later years the astrologer Seni was one of his principal councillors.

Anxious to signalise himself by military deeds, Waldstein went to Hungary, and served in the imperial army against the Turks. After the peace of Sitvatorok, in 1606, Waldstein returned to Bohemia, and married an aged but wealthy widow, who died in 1614, and left him large estates in Moravia. In 1617 he raised a body of 200 dragoons, with which he assisted the archduke Ferdinand of Austria, who was at war with the Venetians. In a short time he saw himself at the head of several thousand men, and, after the successful conclusion of the campaign, towards the end of 1617, the emperor Matthias made him his chamberlain and colonel in his armies, and created him count. Immediately afterwards he married the daughter of count Harrach, and the Emperor on this occasion conferred upon him the dignity of a count of the Holy Roman Empire. The states of Moravia appointed him commander of the Moravian militia; but on his refusal to join the Bohemians against the Emperor, they deprived him of his command, and confiscated his estates. Waldstein was now appointed quarter-master-general of the imperial army, and in the course of the following campaign, by his timely relief of

Boucquoi, who was attacked by counts Mansfeld and Thurn near Teyn (June 10, 1619), he saved the Emperor from being made a captive in his own capital. It seems that, the resources of the emperor being exhausted, Waldstein gave large sums for the support of his master. After the overthrow of king Frederic of Bohemia, the estates of his adherents were confiscated, and the reward of Waldstein was the lordship of Friedland, and other property of immense value.

Waldstein was neither intoxicated by his triumph nor by his wealth. In 1621 he took the field against Betlen Gabor, the prince of Transylvania, and forced him to sue for peace, which was granted on condition that he should give up his claim to the crown of Hungary. During the two ensuing years Waldstein was principally occupied with the management of his estates. But Betlen Gabor having again taken up arms against the Emperor, Waldstein hastened to Hungary, and arrived just in time to save the imperial army, which was besieged in the camp at Goding, on the frontiers of Moravia. As a reward for this victory, the Emperor, towards the close of 1623, conferred upon him the title of Prince, and in the following year, 1624, created him Duke of Friedland and Prince of the Holy Roman Empire.

On the declaration of war of the Union of Lower Saxony, headed by Christian IV., king of Denmark, which put the Emperor into great embarrassment, Waldstein raised at his own expense 28,000 men, with whom he marched towards the Lower Elbe. The renown of his military skill, his wealth, and his liberality, was so great, that men flocked to his camp from all parts of Europe, whom the iron hand of their commander kneaded into a well-united mass. The glorious results of this campaign for the imperialists belong to the history of the Thirty Years' War. The campaign was begun and finished in 1626. Waldstein lost 20,000 men by disease and fatigue, but in the beginning of 1627 he was again at the head of 50,000 men. On Aug. 1, 1627, he was at Troppau. On the 30th he took Dömitz in Mecklenburg, after a rapid march of 250 miles.

The Danish war was finished by the peace of Lübeck (May 13, 1629). Waldstein's reward was the duchies of Mecklenburg. He chose Wismar for his residence, and obtained from the Emperor the title of Admiral of the Baltic and the Oceanic Sea (the German Sea). His plan was to form a navy with the assistance of the Hanseatic towns, and to prevent Gustavus Adolphus, the king of Sweden, from choosing Germany for the theatre of his ambition.

No sooner was Waldstein invested with Mecklenburg, than his numerous secret enemies changed their calumnies and intrigues into open accusations. Maximilian, duke of Bavaria, and Tilly, were among the most powerful of his enemies. Maximilian at length declared to the Emperor that he and all Germany would be ruined if the 'dictator imperii' remained longer at the head of the imperial armies. Ferdinand, after long hesitation, dismissed Waldstein from his command in 1630, at the very moment when Gustavus Adolphus left the coast of Sweden for the invasion of Germany. Waldstein then retired to Bohemia, and resided alternately at Prague and at Gitschin, where he lived with such splendour as to make the Emperor himself jealous.

The invasion of Gustavus Adolphus, the defeat of the imperial armies at Leipzig, the conquest of Bavaria by the Swedes, and the death of Tilly, have been related. [GUSTAVUS II; TILLY.] The empire was on the brink of ruin, and there was only one man who could save it. This man was Waldstein. When he at last yielded to the supplications of the Emperor to resume the command, he showed that he felt all his importance. Among his other conditions he demanded that he should have the sovereignty of the provinces that he might conquer; and that the Emperor should give him as reward one of his hereditary states (Bohemia?), of which he should be the sovereign, though as a vassal of the Emperor.

The campaign of Waldstein against Gustavus Adolphus is mentioned under THIRTY YEARS' WAR. After losing the battle of Lützen, he punished with death many generals, colonels, and inferior officers who had not behaved well in the engagement. He soon repaired his losses, and his arms were victorious in Saxony and Silesia. But his haughtiness became insupportable, and he openly manifested his design to make himself a powerful member of the empire. His old enemies, among whom was the duke of Bavaria, now conspired against him. They represented him as designing to overthrow Ferdinand's power in Germany, and the Emperor was the more ready to believe the accusation, as it became known that France had offered to Waldstein to aid him in obtaining the crown of Bohemia. The Emperor ordered him to withdraw from Bohemia and Moravia, and to take up his winter-quarters in Lower Saxony (Dec., 1633); but Waldstein neither would nor could obey this order, which he regarded as a violation of the conditions on which he had resumed the command. Finding however that the Emperor was resolved to dismiss him, he prepared to resign the command. His faithful lieutenants urged him not to abandon them, and, in order to prove their invariable attachment, they signed a declaration at Pilsen, Jan. 12, 1634, in which they promised to stay with Waldstein as long as he would be their commander. This is the famous declaration which has always been represented as a plot against the Emperor. Piccolomini, Gallas, and several other Italian and Spanish officers availed themselves of the occasion to ruin Waldstein, and induced the Emperor to sign an order by which Waldstein was deprived of his command and declared a rebel. Piccolomini and Gallas were commissioned to take Waldstein dead or alive. Waldstein ultimately took refuge in the castle of Eger, whence he tried in vain to negociate with his enemies. It was through the treachery of some of his own officers, who had been bribed by the Emperor, that he was destined to die. On Feb. 25, 1634, the commandant of Eger gave a splendid entertainment to Waldstein's officers, at which the Duke was not present on account of his ill health. After dinner an armed band rushed into the room, and the friends of Waldstein fell be-

neath their swords. Captain Devereux, at the head of thirty Irishmen, then rushed into the apartment of Waldstein, who received his death calmly from the hands of their leader, as he stood defenceless, and in his night dress.

WALLER, SIR WILLIAM, was of the family of the Wallers of Speldhurst, in Kent, and was born in 1597. After pursuing his studies for a time at Magdalen Hall and Hart Hall, Oxford, he went to Paris; and afterwards entered the service of the confederated powers in the war against the Emperor. On his return home he received from Charles I. the honour of knighthood. In 1640 Sir William Waller was returned to the Long Parliament for Andover; and he immediately took his place among the opponents of the court. On recourse being had to arms, Sir William was appointed one of the parliamentary generals, and he distinguished himself on various occasions, especially in the reduction of Portsmouth, Sept., 1642. He however sustained several defeats. Waller was one of the leaders of the Presbyterian party in the House of Commons, till the impeachment of the eleven members, of whom he was one, by the army (June 23, 1647), when he withdrew from the house. He returned however after a time, and continued to attend until driven out by force, along with all the other members of his party, by Colonel Pride, Dec. 6, 1648. From this time we hear no more of him till after the death of Cromwell, when, in Aug., 1659, he was taken up on the charge of being engaged in the Cheshire insurrection, and was detained in custody till November following. He probably resumed his seat in the house with the other secluded members, in Feb., 1660; and he was nominated one of the Council of State constituted by the house on the 25th of that month. To the Convention Parliament, which met in April, he was returned as one of the members for Middlesex. He died Sept 19, 1668.

WALLER, EDMUND, was born March 3, 1605, at Coleshill, in the county of Hertford. His father was Robert Waller, Esq., of Amersham, in Buckinghamshire. Through his mother he was first cousin to Hampden, the patriot, and he was therefore related to Cromwell. Edmund was still in his boyhood when his father died, leaving him an estate of 3500*l.* a year.

He was educated at Eton, whence he proceeded to King's College, Cambridge. When he first sat in parliament is doubtful; but it is certain that he represented Amersham in Charles's third parliament, which sat from March, 1627, to March, 1628, and also both in the short parliament of April, 1640, and in the Long Parliament, which assembled in November of the same year.

The earliest of Waller's poems is commonly assumed to have been produced towards the end of 1623, when the event which it celebrates happened, the escape of the Prince (afterwards Charles I.) from being shipwrecked. Yet it certainly was not published till some years later; and it seems most likely that it was not composed at the time of the escape.

Waller had meantime married, but his wife dying, he seems to have amused himself by making love to more than one high-born lady. Among those for whom he professed a passion were the Lady Dorothea Sydney, eldest daughter of the Earl of Leicester, and the Lady Sophia Murray, who are celebrated respectively in his verses as Sacharissa and Amoret. He was unsuccessful however in both suits, and soon after married a lady of less exalted rank, who brought him thirteen children.

When government by parliaments was resumed, after an interruption of twelve years, in 1640, and Waller found himself again in the House of Commons, he joined the party in opposition to the court. On the approach of the crisis however he seceded from his party. When the King set up his standard at Nottingham in August, 1642, Waller sent him a thousand broad pieces. He soon afterwards returned to his place in parliament, and spoke openly on the royal side. Waller was one of the commissioners sent by the parliament to the King at Oxford, after the battle of Edgehill, Jan., 1643, and it was soon after this, in the end of May, that the design known as Waller's Plot was discovered. It is difficult to say what was really the object of this so-called plot or conspiracy; but it is certain that, through Waller's own confessions, several persons were hanged and imprisoned. As for Waller, undoubtedly the prime contriver of the design, whatever it amounted to, his life was saved, owing partly to his abject servility, partly perhaps to his wit and dexterity; but the facts connected with his deliverance are variously related. He lay in prison a year, and was then set at liberty on an understanding that he should leave the country. Of his property all that was exacted from him was a fine of 10,000*l.*; but it is said that he expended three times that sum besides in bribes.

On his release, Waller retired to France, and took up his residence first at Rohan, afterwards in Paris, where, we are told, he lived in great splendour. It was during his exile that, in 1645, he published in 8vo. the first collection of his poetry. At last, apparently about 1653, he obtained Cromwell's permission to return to England; and came over and established himself at Hall-Barn, near Beaconsfield. Although his mother continued a professed royalist, Waller soon insinuated himself into favour with Cromwell, to whom in 1654 he addressed 'A Panegyric to my Lord Protector, of the present greatness and joint interest of his Highness and this Nation.' In a similar strain he afterwards took occasion, in celebrating Blake's victory over the Spanish fleet, in Sept. 1656, to recommend to Cromwell the assumption of the name, as well as the power of a king. The next of his poems is still in the same vein, 'On the Death of the Lord Protector;' but this is immediately followed in the collection by one 'To the King, upon his Majesty's Happy Return.' The Restoration however restored Waller to his former position more completely than his recall by Cromwell had done. He now became once more a first figure both at court and in the state. It does not appear that he sat in what is called the Convention Parliament, which brought the king back; but to the next, or Charles's Long Parliament, which met in March, 1661, and continued till

1679, he was returned for Hastings; in the next, which met in March, 1679, he sat for Chipping-Wycombe. To the parliament of James II., which met in May, 1685, the octogenarian poet was returned as one of the members for Saltash.

One of Waller's latest poetical performances was a copy of verses entitled 'A Presage of the Ruin of the Turkish Empire,' which he presented to James II. He did not live to witness the Revolution. He died at Beaconsfield, Oct. 21, 1687. It is noted that his heir joined the Prince of Orange.

WALLI'CHIA, a genus of plants named in honour of Dr. Wallich, superintendent of the East India Company's Botanical Garden at Calcutta. This genus belongs to the natural order *Buttneriaceæ*. The only species is the *W. spectabilis*, which is a beautiful tree attaining a height of 30 or 40 feet. It is a native of Nepaul.

WALLINGFORD, a market-town, municipal borough, and parliamentary borough, in Berkshire, is 51 miles E. by N. from London by the road, or about 50 by the Great Western Railway, which passes the town at about 2 miles distance. The town is ancient, and there was a castle there at the time of the Norman Conquest. It stands on the E. or right bank of the Thames, over which there is a stone bridge leading to Crowmarsh Street. The town consists of several streets, and has a very neat appearance. It contains three churches, and four or five places of worship for dissenters. The municipal borough is governed by 4 aldermen and 12 councillors, and had in 1841 a population of 2780. The parliamentary borough, which returns one member, includes several adjoining parishes, and included, in 1841, a population of 7780.

WALLIS, JOHN, was the eldest son of the Rev. John Wallis, incumbent of Ashford in Kent, where he was born Nov. 23, 1616.

The father of Wallis died when he was six years old, leaving five children to the care of his widow. He was fifteen years old when his curiosity was excited by seeing a book of arithmetic in the hands of his younger brother, who was preparing for trade. On his showing some curiosity to know what it meant, his brother went through the rules with him, and in a fortnight he had mastered the whole. He was entered at Emanuel College in Cambridge, where he soon obtained reputation. Among his other studies, anatomy found a place; and he is said to have been the first student who maintained, in a public disputation, the doctrine of the circulation of the blood, which had been promulgated by Harvey four or five years before. After taking the degree of master of arts, he was chosen fellow of Queen's, and took orders in 1640. He was then chaplain in one and another private family, residing partly in London, till the breaking out of the civil war, in which he took the side of the Parliament. He made himself useful to his party by deciphering intercepted letters, an art in which he was eminent. In 1643 the sequestrated living of St. Gabriel, Fenchurch Street, was given to him; and in the same year he published 'Truth Tried, or Animadversions on the Lord Brooke's Treatise on the Nature of Truth.' In this year also he came into a handsome fortune by the death of his mother. In 1644 he was appointed one of the secretaries of the Assembly of Divines at Westminster. In this year also he married. In 1645 he was among the first who joined those meetings which afterwards gave rise to the Royal Society. When the Independents began to prevail, Wallis joined with others of the clergy in opposing them; and in 1648 subscribed a remonstrance against the execution of Charles I. In 1649 he was appointed Savilian professor of geometry at Oxford by the Parliamentary visitors. He now removed to Oxford, and applied himself diligently to mathematics. At the end of 1650 he first met with the method of indivisibles in the writings of Torricelli, and from this time his celebrated researches begin.

In 1658 Wallis, who with others desired the restoration of the kingly power, employed his art of deciphering on the side of the Royalists; so that at the Restoration he was received with favour by Charles II., confirmed in his professorship and in the place of keeper of the archives at Oxford, and was made one of the royal chaplains. In 1661 he was one of the clergy appointed to review the Book of Common Prayer. He was of course one of the first members of the Royal Society, and from this to his death his life is little more than the list of his works. The collection of his works by the curators of the Oxford university press began to be made in 1692; the three volumes bear the disordered dates of 1695, 1693, and 1699. In 1692 he was consulted upon the adoption of the Gregorian calendar, or new style, against which he gave a strong opinion, and the design was abandoned. In 1696, when the first two volumes of his works appeared, he was the remote occasion of beginning the controversy between the followers of Newton and Leibnitz. Some remarks were made on his assertions as to the origin of the differential calculus in the Leipzig Acts, which produced a correspondence, and this correspondence was published in the third volume. He died October 28, 1703, in his 88th year.

Wallis, in his literary character, is to be considered as a theologian, a scholar, and a mathematician. As a divine, he would probably not have been remembered, but for his eminence in the other characters. His discourses on the Trinity are still quoted in the histories of opinions on that subject. If the character of Wallis has been elevated as a divine by his celebrity as a philosopher, his services as a scholar have for the same reason been, if not underrated, at least thrown into a shade. He was the first editor of the 'Harmonics' of Ptolemæus, of the commentary on it by Porphyrius, and of the later work of Brennius; as also of Aristarchus of Samos.

As a mathematician Wallis is the most immediate predecessor of Newton, both in the time at which he lived and the subjects on which he worked. Those who incline to the opinion that scientific discoveries are not the work of the man, but of the man and the hour, that is, who regard each particular conquest as the necessary conse-

quence of the actual state of things, and as certain to come from one quarter or another when the time arrives, will probably say that if Wallis had not lived, Newton would but have filled his place, as far as the pure mathematics are concerned.

WALNUT-TREE, the common name of the species of *Juglans*, a genus of plants belonging to the natural order *Juglandaceæ*. All the species are large trees. There are four species of Juglans, three of which are natives of North America and one of Asia.

The Royal or Common Walnut-Tree (*Juglans regia*) is the oldest and the best known of the species. There is no history of the introduction of this tree into Great Britain, but it is now very commonly cultivated in this country, although it fails to propagate itself by its seeds. It is only however in the southern and middle parts of England that the walnut brings its fruit to perfection.

The uses of the walnut-tree are various. Before the introduction of mahogany and other foreign woods, the wood of the walnut-tree was held in higher estimation than that of any other European tree.

In almost every stage of its growth the fruit of the walnut-tree is used. When young, green, and tender, walnuts are pickled and preserved with the husks on. About the end of June they may be preserved with or without their husks. When the nuts are fully ripe, which is generally at the end of September or the beginning of October, the kernel, deprived of its investing skin, is eaten in great quantities. As long as the skin can be easily removed, they are a nutritious and healthy article of diet; but when they get dry, so that their skins stick to them, they become indigestible. A great number of the walnuts consumed in England are of foreign growth.

The albumen which constitutes the bulk of the seed of the walnut contains an oil, which is used in large quantities, especially on the Continent. It is obtained by reducing the seeds to a pulp by means of a stone wheel and basin, and then expressing the oil, first without heat, and then by the application of heat. The oil obtained by heat is used by artists, and also for lamps.

All parts of the walnut-tree, excepting the albumen of the seed, possess a bitter principle, which acts as a tonic and anthelmintic, and was formerly much esteemed as a medicine.

The Black Walnut Tree (*Juglans nigra*) is a North American tree, and is found in all parts of the United States, as far as 40° 50′ N. lat. It is one of the first trees that was introduced from America to Europe, having been brought to England by the younger Tradescant in 1656. The Black Walnut is a rapid-growing tree, and attains a height of 50 or 60 feet in about 40 years. It bears fruit in this country, but it is very much inferior to that of the European walnut.

The Gray Walnut or Butternut Tree (*Juglans cinerea*) is from North America. It is found in Upper and Lower Canada and in the temperate regions of the United States. This tree attains in its native regions a height of about 50 or 60 feet. The kernel of the nut affords a thick oil which soon becomes rancid, and hence probably the names of butter-nut and oil-nut.

WALPOLE, SIR ROBERT, Earl of Orford, the third son of Robert Walpole, Esq., M.P. for Castle Rising, was born at Houghton, Aug. 26, 1676. He was educated at a private school at Massingham, and afterwards on the foundation at Eton, and at King's College, Cambridge. His father died Nov. 28, 1700, and left him the family estate. He immediately entered parliament as a member for Castle Rising; and joined the Whigs in promoting the Protestant succession. He attracted the attention of the leaders of the party; and in March, 1705, was appointed one of the council to Prince George of Denmark, then lord high admiral. Henceforward he assumed a high position in parliament; and in 1708, on his promotion to the office of secretary-at-war, the management of the House of Commons was entrusted to him by his party. In 1710 he was appointed one of the managers for the impeachment of Sacheverel. The Whig administration being shortly afterwards broken up, Harley vainly endeavoured to persuade Walpole to accept a place in the new cabinet, and declared him to be worth half his party. When the ex-ministers were charged with corruption and inaccuracy in the public accounts, their defence was ably conducted by Walpole; but he was punished for his zeal by a similar accusation directed against himself personally. On Jan. 17, 1712, a majority of the House resolved that while secretary-at-war he had been 'guilty of a high breach of trust and notorious corruption,' and he was accordingly committed to the Tower and expelled the House of Commons. His popularity however remained undiminished, and he did more for his vindication with his pen while in prison, than he could have done in the face of his enemies, who had already condemned him. He remained a prisoner until the prorogation of parliament, and at the dissolution in Aug. 1713, he again entered parliament as member for Lynn.

On the accession of George I., Walpole, with his brother-in-law Viscount Townshend, had a principal share in the formation of the Whig administration. He was himself appointed paymaster-general of the forces and of Chelsea Hospital. Walpole took a leading part in the prosecution of the various leaders of the Tory party for intriguing in favour of the Pretender; and when the rebellion broke out, he was appointed first lord of the treasury and chancellor of the exchequer. The fatigue and anxiety of that alarming time brought on a severe illness. Before his recovery the memorable Septennial Bill, which had been prepared with his concurrence, was passed. Disunion in the cabinet and the constant intrigues of the Hanoverian courtiers and the king's mistresses broke up this administration; and in April, 1717, Walpole delivered up his seals to the king. He now distinguished himself by the ability and practical knowledge with which he opposed the measures of government.

In June, 1720, he consented to take office, and was appointed paymaster-general of the forces, and subsequently first lord of the treasury on the

resignation of Lord Sunderland in April, 1721. He had meantime acquired great reputation by the means which he had taken to restore public credit after the South Sea panic (the failure of which scheme he had predicted), and the firmness and moderation which he displayed in punishing the offenders.

Having settled for a time the financial affairs of the country, Walpole turned his attention to commerce, and removed various heavy taxes and restrictions upon the imports and exports of many of the most important articles. In June, 1723, the king created Walpole's son a peer. Walpole had declined this honour himself, from the fear of losing his influence over the House of Commons. In 1724 he was created a Knight of the Bath, and in 1726 was installed a Knight of the Garter.

To follow Sir Robert Walpole through the events of his long administration would require little less than a history of his times. There were no important debates in parliament, no deliberations in the cabinet, no negociations with foreign states, in which he did not bear the most conspicuous part as the first statesman of his day.

In 1737 the influence of Walpole was much shaken, first by the quarrel between the king and the Prince of Wales, and the hostility of the latter to the king's government, and especially to Walpole, who had been chiefly consulted by the king; and, secondly, by the death of Queen Caroline, who had always been one of his strongest friends and supporters.

Walpole was soon in the midst of great embarrassments. The king, the people, a strong minority in the Commons, a majority in the Lords, and a preponderance in the cabinet, were eager for war with Spain. Walpole endeavoured to avert it as a national calamity, but was overpowered by the union of so many parties in its favour, nor was his resignation accepted by the king when tendered. Discord ensued in the cabinet, and the opposition in parliament became more strenuous than ever. In Feb. 1740, a motion was made, by Sandys, for an address to the crown for the removal of Sir Robert Walpole 'from his majesty's presence and counsels for ever.' No distinct charges were made against the minister; but every complaint against the measures of his government, foreign or domestic, during the last twenty years, was used as a reason for his dismissal. Walpole defended himself with boldness and dignity, and the motion was negatived by a large majority in both houses. But, notwithstanding this triumph, his power was nearly exhausted. A dissolution followed. After several close divisions in the next parliament, he was, Feb. 2, 1742, left in a minority of sixteen, on the Chippenham election case. On the 9th he was created Earl of Orford by the king, and on the 11th he resigned.

No sooner was a new administration formed under Pulteney than an attack was made upon the ex-minister. A secret committee appointed by the House of Commons, made a report, in which they charged Walpole—1, with having used undue influence at elections; 2, with grants of fraudulent contracts; and, 3, with peculation and profusion in the expenditure of the secret service money. These charges were but ill supported, and the report must be regarded, if not as a verdict of acquittal, at least as one of *not proven*. A motion for renewing the inquiry was repeated in the following session, but was defeated by a large majority. From this time Walpole took very little part in public affairs. He was frequently consulted by the king, and retained much political influence, but rarely spoke in the House of Lords. After dreadful suffering from the stone, he died, March 18, 1745.

WALPOLE, HORACE (Earl of Orford), the third and youngest son of Sir Robert Walpole, was born Oct. 5, 1717. When he had finished his education at Eton, and at King's College, Cambridge, he left England, and travelled for more than two years. On his return home in Sept., 1741, Walpole took his seat in the House of Commons as member for Callington. He did not take any prominent part in the debates, and when the interest excited by his father's affairs had subsided, he rarely addressed the House. He moved the address in 1751, and spoke in 1756 on the question of employing Swiss regiments in the colonies. In 1757 he exerted himself with much ardour in favour of Admiral Byng. These are the chief events of his public life, although he remained in parliament till 1768.

The principal amusement and business of Walpole for many years of his life were the building and decoration of his gothic villa of Strawberry Hill, at Twickenham. He collected works of art and curiosities of every description to ornament his house and gratify his tastes—prints, pictures, miniatures, armour, books, and manuscripts. He was enabled to indulge in these expensive pursuits by the profits of three sinecure offices which his father had obtained for him, viz. usher of the exchequer, comptroller of the pipe, and clerk of the estreats.

To the tastes of a virtuoso he added those of a man of letters. His earliest compositions were in verse; they are not imaginative, and evince but little aptness for versification. In 1752 he published his 'Ædes Walpolianæ.' In 1758 he published his 'Catalogue of Royal and Noble Authors.' In 1761 he commenced the publication of 'Anecdotes of Painting in England,' which was not completed until 1771; and in 1763 he added a 'Catalogue of Engravers.'

Walpole's celebrated novel, the 'Castle of Otranto,' appeared in 1764, as a translation, by William Marshall, from the Italian of Onuphrio Muralto, which the author intended as an anagram of his own name. Four years later was published his tragedy of 'The Mysterious Mother.' His next work was the 'Historic Doubts on the Life and Reign of King Richard III.' He was besides continually publishing minor compositions, such as papers in the 'World' and other periodicals, his 'Essay on Modern Gardening,' the 'Hieroglyphic Tales,' and 'Reminiscences of the Courts of George I. and II.' He also prepared 'Memoirs' of the last ten years of the reign of George II., which were not published until after his death. But the cleverest and certainly the most enter-

taining of all Walpole's writings are his letters, addressed to various friends, collected by himself, and published at different times since his death. Most of them have been collected, and were published in 1840, in six volumes, 8vo.; but there have been several additions since that time. This series comprises a period of more than sixty years, from 1735 to 1797.

In 1791 Walpole succeeded his nephew, George, third earl of Orford, in the title and estates of his family. He died at his house in Berkeley Square, London, March 2, 1797.

WALRUS. [SEALS.]

WALSALL. [STAFFORDSHIRE.]

WALSHAM, NORTH. [NORFOLK.]

WALSINGHAM, NEW. [NORFOLK.]

WALSINGHAM, or WALSINGHAMUS, THOMAS, was a native of Norfolk, and a monk of the Benedictine abbey of St. Albans. He is the author of two historical works which have come down to us, the one entitled 'Historia Brevis, ab Edvardo primo ad Henricum quintum' (it extends in fact from A.D. 1273, the first year of Edward I., to 1422, the last year of Henry V.); the other, 'Ypodigma Neustriæ, vel Normanniæ, ab Irruptione Normannorum usque ad annum 6 regni Henrici quinti' (A.D. 1418). Both these works were published together by Archbishop Parker, in folio, London, 1574. Both are also contained in Camden's 'Anglica, Normannica, Hibernica, Cambrica à Veteribus Scripta,' fol., Francof., 1603. Walsingham has in both his works preserved many facts which are not elsewhere to be found.

WALSINGHAM, or WALSYNGHAM, SIR FRANCIS, was descended from an ancient family, and was born at Chiselhurst in Kent, it is commonly stated in the year 1536. After studying at King's College, Cambridge, Walsingham went to travel on the Continent; and he remained abroad till after the accession of Elizabeth. On his return to England his accomplishments recommended him to the notice of Cecil, under whom he was soon introduced to high and confidential employment in the public service. He was sent twice to Paris, and on his return home from his second mission he was appointed one of the principal secretaries of state and sworn of the Privy Council; and soon after he was knighted. In 1578 he was sent as ambassador to the Netherlands; in 1581 again to France; and in 1583 to Scotland. In Oct., 1586, he served as one of the commissioners at the trial of Mary Queen of Scots. Soon after this he was made chancellor of the duchy of Lancaster. Walsingham's system of policy was founded upon and maintained by bribery, espionage, and all the forms of deception; but he was notwithstanding the very reverse of a man of mere expediency. His personal integrity and disinterestedness are unquestionable; his morality was strict, to the verge of asceticism; his religious zeal drew him all his life towards puritanism. He died April 6, 1590, having for some time previously lived in retirement.

There is a short paper by Walsingham, entitled 'Sir Francis Walsingham's Anatomising of Honesty, Ambition, and Fortitude,' in the 'Cottoni Posthuma; or, Divers and Choice Pieces of Sir Robert Cotton,' London, 4to., 1672. His title to the authorship of the treatise entitled 'Arcana Aulica; or, Walsingham's Manual, or Prudential Maxims,' which has been several times printed, is doubtful.

WALTHAM ABBEY. [ESSEX.]

WALTHAM, BISHOP'S. [HAMPSHIRE.]

WALTHE'RIA, a genus of plants belonging to the natural order *Sterculiaceæ*. *W. Americana* is a shrub about 4 feet in height, with yellow flowers. It is a native of the Bahama Islands, of Surinam, and the Caribbee Islands. *W. Durandinha* is a native of Brazil on the banks of the river Uruguay. This plant, like the whole of the order to which it belongs, contains much mucilaginous matter, and is used in decoction in the Brazils.

WALTON-ON-THAMES. [SURREY.]

WALTON, IZAAK, was born at Stafford, Aug. 9, 1593. Except that he was left an orphan in 1596-7, nothing is known of him up to the age of twenty. After this we find him living in Fleet Street, London, where he appears to have carried on the business of a hosier. His first avowed literary work seems to have been an elegy upon the death of his friend Dr. Donne (1633), whose life he subsequently wrote, prefixed to the collection of Donne's sermons, published in 1640.

Previous to this publication Walton had removed into Chancery Lane, where he lost his first wife. In 1644 he left Chancery Lane, and up to the year 1651 his residence is wholly uncertain. About 1647 he married Anne Ken, half-sister of Bishop Ken. In 1651 Walton published a collection of Sir Henry Wotton's letters, poems, &c., under the title of 'Reliquiæ Wottonianæ,' to which he prefixed the 'Life of Wotton.'

Walton had by his marriage connections identified himself with the Royalist party, and the 'Lesser George' was confided to his care after the battle of Worcester, by Charles II., for safe conveyance to London.

In 1653 the work upon which his fame principally rests appeared—'The Complete Angler, or Contemplative Man's Recreation,' of which numerous editions have been published. In 1662, having again become a widower, he went to reside with Dr. Morley, who was just then made bishop of Winchester.

In 1670 the 'Life of George Herbert' was published, for the materials of which he was indebted to Dr. Henchman, bishop of London. A collected edition of the 'Lives' also appeared at this time. In 1678 his last literary effort appeared: the Life of his friend Bishop Sanderson.

Walton died at Winchester, Dec. 15, 1683.

WALWORTH. [SURREY.]

WANDEROO. [MACACUS.]

WANDSWORTH. [SURREY.]

WANLEY, REV. NATHANIEL, is the author or compiler of a work which first appeared in a folio volume in 1678, and has been often reprinted in various forms, entitled 'Wonders of the Little World.' The little world is the microcosm, man, and the work consists of a collection

of remarkable stories illustrative of human nature. Wanley was born at Leicester in 1633, studied at Trinity College, Oxford, took his degree of B.A. in 1653, and that of M.A. in 1657. In the latter part of his life he was vicar of Trinity Church in Coventry; and died in 1680.

WANTAGE. [BERKSHIRE.]

WAPENTAKE. [SHIRE.]

WARASDIN. [CROATIA.]

WARBECK, PERKIN. [HENRY VII.]

WARBLERS [SYLVIADÆ]. a family of small slender-billed singing birds, included by Linnæus within his genus *Motacilla*.

The *Sylviadæ* principally inhabit woods, thickets, orchards, and gardens, but some affect watery situations and reed-marshes. Many are remarkable for the melody of their song, and the sprightliness of the airs which in the period of incubation they incessantly pour forth. As examples we may mention the NIGHTINGALE, the BLACK-CAP, the Redbreast, &c.

Living almost exclusively on the winged insects of summer, which they dextrously catch in the air, or pick from off the leaves, they migrate to the south in the autumn, and pass their winter in warm or tropical regions. To this rule there are certain exceptions. The Redbreast, the Wren, the Golden-Crested Wren, &c., are permanent residents in our island. These birds, in the latter part of autumn and during the winter, feed partly on berries and partly on the eggs and pupæ or larvæ of insects concealed in fissures of the bark of trees, or attached to the twigs of brushwood and thick hedgerows. Among the migratory species, the males, as a general rule, precede the arrival of the females to their summer breeding places.

Mr. Gould, in his 'Birds of Europe,' describes four species of Wheatear (*Saxicola*), of which one is a summer visitant to our island. The others are all continental. To these must be added the Whinchat and the Stonechat, both British. Of the Redstarts three species are given:—the Redstart (*Phœnicura ruticilla*), the Black Redstart (*Ph. tithys*), and the Blue-Throated Warbler (*Ph. Suecica*). The latter two are rare in Britain. [BLUE-BREAST.] Of the Redbreasts we have only one European species (*Erythaca rubecala*) familiar to all. Three species of *Accentor*, or Hedge-Sparrow, are described. One is the common Hedge-Sparrow (*Accentor modularis*); the others are continental, viz. the Alpine Accentor (*A. Alpinus*), and the Mountain Accentor (*A. montanellus*).

Of Locustelles (*Locustella*) we may enumerate the Reed Locustelle (*L. fluviatilis*), the Brake Locustelle (*L. avicula*), the Willow Locustelle (*L. luscinoides*), and the Creeping Locustelle (*L. certhiola*). Of these the Brake Locustelle regularly visits Great Britain. Of Salicarias Mr. Gould describes the Great Sedge-Warbler (*Salicaria turdoides*), the Olive-Tree Salicaria (*S. Olivetorum*), the Red Wren (*S. arundinacea*), British; the Marsh-Warbler (*S. palustris*), the Sedge-Warbler (*S. phragmitis*), British; the Moustached Warbler (*S. melanopogon*), the Aquatic Warbler (*S. aquatica*), the Rufous Sedge-Warbler (*S. galactoles*), the Fantail Warbler (*S. cisticola*), the Cetti Warbler (*S. cetti*), and the Silky Warbler (*S. sericea*).

Of the true nightingales Europe has two, the Common Nightingale (*Philomela luscinia*), and the Thrush Nightingale (*Ph. turdoides*).

Of the genus *Calliope* one species, rare in Europe, is known, viz. the Gorget Warbler (*Calliope Lathami*).

Of the genus *Curruca*, we may enumerate the following:—The Orpheus Warbler (*C. orphea*), the Black-Cap (*C. atricapilla*), Rüppell's Warbler (*C. Rüpellii*), the Sardinian Warbler (*C. melanocephala*), the Subalpine Warbler (*C. leucopogon*), the Common White-Throat (*C. cinerea*), the Lesser White-Throat (*C. garrula*), the Spectacle Warbler (*C. conspicillata*), Marmora's Warbler (*C. sarda*), and the Barred Warbler (*C. nisoria*). The genus *Melizophilus* presents us with the Dartford Warbler (*M. provincialis*). This species is common in southern Europe; comparatively scarce in Germany; permanent in England, but not generally diffused. It is found in the neighbourhood of London, at Bagshot, Cobham, &c., and occurs in Devonshire, Cornwall, and Berkshire. Many of the species which we have enumerated are common to Asia as well as to Europe; but the Warblers generally are not abundant in that quarter of the globe. Most zoologists make Africa, and especially its northern regions, their winter quarters.

America has numerous Warblers, but the species generally are not gifted with much power of song. The Prince of Musignano, in his 'Specchio Comparativo,' enumerates 34 North-American species of *Sylvia*, 40 belonging to the subgenus *Dacnis*, and 1 of *Saxicola* (*sialis*). In his 'Birds of Europe and North America,' the same noble author records 45 American species of *Sylvicolinæ*, belonging to the genera *Parula*, *Trichas*, *Vermivora*, *Seiurus*, *Sylvicola*, *Wiltonia*, and *Culicivora*. The bulk of these species are *Sylvicolæ*. He also notices 3 species of *Sialia* (American). In Australia the Warblers are extremely numerous and exquisitely beautiful. In his 'Birds of Australia,' Mr. Gould describes and figures about 78 species of the family *Sylviadæ*, which he divides into 9 subfamilies, each containing, with few exceptions, several genera.

WARBURTON, WILLIAM, was born at Newark, Dec. 24, 1698, and was the elder of the two sons of Mr. George Warburton, an attorney of that place. Warburton lost his father when he was only eight years old. He received the usual grammar-school education; and on leaving school he was placed in the office of an attorney, with whom he continued till April, 1719, when he set up in business for himself at Newark. But a love of study had early taken possession of him: his professional success, probably impeded by these tastes, is supposed not to have been considerable; and at length, having made up his mind to enter the church, he received deacon's orders from Dawes, archbishop of York, in 1723. He now published his first literary performance, a small volume of 'Miscellaneous Translations in Prose and Verse from Roman Poets, Orators, and Historians.' About the end of 1726 he formed

his first literary connection, which was with Theobald, Concanen, and others, who were united by a common hostility to Pope, who had satirised them. Warburton furnished some notes to Theobald's Shakspere, which appeared in 1733. In 1728 Warburton obtained the degree of master of arts at Cambridge, on the occasion of the king's visit; and in the same year his friend and patron, Sir Robert Sutton, presented him to the rectory of Burnt or Brant Broughton, near Newark. The publication which made him generally known appeared in 1736, entitled 'The Alliance between Church and State; or, the Necessity and Equity of an Established Religion and a Test Law demonstrated from the Essence and End of Civil Society, upon the Fundamental Principles of the Law of Nature and Nations.' The arguments of this treatise have been much approved of by those, Bishop Horsley for example, who were already prepared to accept the conclusions. In 1738 appeared the first volume, containing the first three books of his great work, 'The Divine Legation of Moses,' &c. The leading idea of the 'Divine Legation' is, that so important a doctrine as that of a future state, which must be regarded as the chief natural cement and bond of human society, could not possibly have been dispensed with in any scheme of mere human legislation, and that hence the Mosaic dispensation, in which, according to Warburton's view, it is omitted, must have come from heaven, and must also have been maintained in a peculiar manner by a divine or miraculous influence. This view at least was a new one; and it was developed by its author with an ingenuity, a fulness and a variety of learning, and an unflagging animation, such as certainly never had been combined before in any English theological work. But mere theological discussion forms only a small portion of the book; the author is continually making excursions from his argument, and in this way the reader is conducted, in the course of their journey together, over some of the most interesting fields of literature and philosophy. The complete work consists of five volumes.

Six letters that Warburton published on 'The Works of the Learned,' in defence of the orthodoxy of Pope's 'Essay on Man,' introduced him to Pope, who was ever afterwards his zealous friend. Pope on his death, in 1744, left Warburton half of his library, with the property of all such of his works already printed as he had not otherwise disposed of, and all the profits which should arise from any edition to be printed after his death. In 1745 Warburton married Miss Tucker, the niece of Ralph Allen, of Prior Park, Bath; and in the right of his wife he became possessed of Prior Park on Allen's death, in 1764. Pope introduced Warburton to Allen.

Warburton had now a great reputation. In April, 1746, he was elected preacher of Lincoln's Inn. His pen was still busy. He produced an edition of Shakspere in 1747, which did him little credit; an edition of Pope's works in 1757; sermons, and various other things. He was still improving his fortune. He got one of the rich prebends of Durham; in 1757, the deanery of Bristol; and finally, in 1759, he was made bishop of Gloucester. His death took place on the 7th of June, 1779. He left no child, and his widow, in 1781, married the Rev. John Stafford Smith, who had been her first husband's chaplain. A complete edition of the works of Bishop Warburton was published in 1788, by his friend Bishop Hurd, in 7 vols. 4to.

WARD, WARDEN, that is, 'guard' and 'guardian.' Ward is the name used in the counties of Durham, Westmorland, and Cumberland, instead of the Hundred of the midland counties or the Wapentake of Yorkshire, to denote a subdivision of those shires. The neighbourhood of those border counties to the Scots rendered it essential that the military preparation of the inhabitants should be constant. The great officers whose duty it was to defend the northern borders from the Scots, and the north-western from the Welsh, were called Lord-Wardens of the Marches [MARCHES]; and we still have the Lord-Warden of the Cinque Ports and the Lord-Warden of the Stannaries.

WARD, WARDSHIP. [GUARDIAN; FEUDAL SYSTEM.]

WARD, SETH, was born at Buntingford in Hertfordshire, in 1617. He was sent to Sydney Sussex College, Cambridge, of which he subsequently became a fellow.

On the breaking out of the civil war Mr. Ward, having refused to subscribe the 'solemn league and covenant,' was deprived of his fellowship. In 1643 he removed to London, and afterwards obtained employment as a private tutor till 1649, when he became domestic chaplain to Thomas Lord Wenman.

In the same year he obtained the professorship of astronomy at the university of Oxford, and took the oath of allegiance to the commonwealth. In 1654 he took the degree of D.D., and five years afterwards was made principal of Jesus College; he was subsequently chosen president of Trinity College, but these posts he was obliged to resign at the Restoration. While Dr. Ward resided at Oxford he associated himself with the eminent men of the time, and from their meetings arose the Royal Society, of which he became a fellow in 1661.

Through the interest of the Duke of Albemarle and the Earl of Clarendon, he was appointed, in 1660, to the rectory of St. Lawrence, Old Jewry, London. In the same year he was made precentor of the cathedral of Exeter; in the year following he was appointed dean; and in 1662 bishop of Exeter. Five years afterwards he was translated to the see of Salisbury. He died in January, 1689.

His theological works are, 'An Essay on the Being and Attributes of God; on the Immortality of the Soul,' &c., Oxford, 1652, in 8vo.; and a volume of Sermons, which was published in London in 1674; but he is chiefly distinguished by his works on astronomy, the chief of which are—'Prælectio de Cometis;' 'Idea Trigonometriæ Demonstratæ in usum Juventutis;' 'Exercitatio Epistolica in Thomæ Hobbesii Philosophiam;' 'Astronomia Geometrica.'

WARDS. [MUNICIPAL CORPORATIONS.]

WARDS, COURT OF. The Court of Wards and Liveries was established by the statute 32 Henry VIII., c. 46, to superintend the inquests which were held after the death of any of the king's tenants by knight's service, for the purpose of ascertaining what lands the tenant died seised of, who was his heir, and whether the heir was an infant; and thus what rights accrued to the king in the shape of relief, primer seisin, wardship, or marriage.

By the statute passed in the first parliament of Charles II. (12 Charles II., c. 24), the Court of Wards was abolished.

WARE. [HERTFORDSHIRE.]

WARE, SIR JAMES, was born in Dublin, Nov. 26, 1594. He was the son of Sir James Ware, who held the office of auditor-general for Ireland. He went to Trinity College, Dublin, and after six years' residence there, devoted himself to the study of Irish antiquities. He then came to England, and on his return to Ireland in 1629 he was knighted by the Lords Justices. In 1632 he succeeded to his father's estate and office. He applied himself assiduously to public business, and was created a member of the Irish Privy-Council. In 1639 he was elected a member of the Irish House of Commons. When the rebellion broke out in 1641, he assisted the government not only by his personal services, but also by becoming surety for sums of money advanced to it. In December, 1644, he was sent to inform the king, then at Oxford, of the real state of affairs in Ireland. He employed his leisure hours at Oxford in the prosecution of his antiquarian researches, and had the honorary degree of LL.D. conferred upon him by the university.

The vessel in which Sir James Ware returned to Ireland was taken by one of the Parliament's ships. He underwent an imprisonment of ten months in the Tower of London, and was released by an exchange of prisoners. In 1647 he was one of the hostages for the performance of the treaty by which the Earl of Ormond surrendered Dublin to the Parliament. He was deprived of his office of auditor-general, and eventually obliged to retire to France, whence he returned in 1651.

In 1661, he having in the meantime been reinstated as auditor-general, the university of Dublin elected Sir James Ware one of its representatives. He was offered the title of baronet or viscount, but declined both. He died in Dublin, Dec. 1, 1666.

Sir James Ware's more important works are:—1. 'De Præsulibus Hiberniæ Commentarius,' Dublin, 1665, fol. 2. 'De Hibernia et Antiquitatibus ejus Disquisitiones,' London, 1654–8. 3. 'De Scriptoribus Hiberniæ Libri Duo,' Dublin, 1639–40. 4. 'Rerum Hibernicarum Annales, regnantibus Henrici VII., Henrici VIII., Edvardo VI., et Maria,' Dublin, 1662, fol. A translation of Sir James Ware's works into English was published in 1705, by his second surviving son Robert; a more complete edition, with additions, in 1739–46, by Walter Harris.

WAREE. [GUINEA.]

WAREHAM. [DORSETSHIRE.]

WARING, EDWARD, the son of a wealthy farmer who resided near Shrewsbury, was born in 1736. Having shown at an early age a decided taste for geometry and algebra, he was sent, in 1753, to Magdalen College, Cambridge, where he made great progress in mathematical analysis; and, in 1760, he obtained the Lucasian professorship of mathematics.

In 1763, being then M.A., Mr. Waring was elected a fellow of the Royal Society; and in several of the volumes of the 'Philosophical Transactions' there are papers by him on subjects connected with the theory of equations, centripetal forces, &c. Mr. Waring studied medicine, and in 1767 he took the degree of M.D.; but he does not appear to have had much practice. His life was spent chiefly at the university, where he performed the duties of his professorship. He died Aug. 15, 1798.

He was considered the most learned analyst of his age. Independently of the papers above alluded to, he published at Cambridge the following treatises:—'Miscellanea Analytica de Æquationibus Algebraicis et Curvarum Proprietatibus,' 4to., 1762; 'Meditationes Algebraicæ,' 4to., 1770; 'Proprietates Algebraicarum Curvarum,' 4to., 1772; 'Meditationes Analyticæ,' 4to., 1776.

WARKWORTH. [NORTHUMBERLAND.]

WARMING and VENTILATION. Several kinds of fire-places or stoves give out heat by *conduction* chiefly, others do so mainly by *radiation*. Open fire-places are of the latter kind, and a considerable loss of heating-power results from the arrangement. The burning coals radiate heat into the room, and another portion of heat is reflected from the metallic portions of the grate; but the heated air, which ought to contribute to the desired effect, is mainly allowed to escape up the chimney with the smoke and other results of combustion. Dr. Arnott, in his 'Treatise on Warming and Ventilation,' enumerates about a dozen evils which are more or less inseparable from open fires. Among these are waste of fuel, unequal heating, a stratum of cold air near the floor, the production of smoke and dust, loss of time in attendance, danger to person and property. Many contrivances have been brought forward to obviate one or other of these inconveniences. Count Rumford suggested the 'register-stove,' the peculiarity of which consists in narrowing the throat of the chimney by a plate which can be moved to vary the size of the aperture; by this means, particularly if the opening be near the fire, the very hot air directly from the fire enters before it can mix with much colder air from the room, and thus the draught is increased so as to lessen the chance of smoking. But there is a great waste of heat in this as in all other open fire-places.

The common Dutch stove is one of the simplest examples of a *close stove*. It generally consists of a cylindrical case of sheet-iron, within and near the bottom of which is a grating for containing the fuel. There is an ash-pit beneath the grating, and three openings to the interior—one to the ash-pit, one for introducing the fuel above, and one leading to a flue or chimney. In this form of stove the heated iron case warms the air, which thus becomes much more nearly equalised in

temperature than it is by a common fire. There is also great economy of fuel, and an absence of smoke and dust; but the air of the room acquires a dry, sulphureous, and unhealthy condition. In Russian stoves, earthenware and brickwork are largely used, instead of metal, as a means of making the heat less intense near the stove, and of keeping up a reservoir of heat after the fire is extinguished. The stove is built in a massive style, and consists of a series of chambers, of which the lowest serves as the fire-place, and the upper ones as flues, and being composed almost entirely of brick and porcelain, the outer surface remains at a moderate temperature for a very long period.

Dr. Arnott has the merit of having devised means to prevent the too intense heating of the air near close metallic stoves. In his new form of stove the fuel is put into a small fire-box, enclosed within a larger case of sheet-iron; the only openings in the outer case being a door at which the fuel is introduced, an air-hole beneath the grate, and a chimney for the exit of smoke, which chimney, being merely a metallic tube three or four inches in diameter, can be easily arranged in position. The interior of the outer case is nearly divided into two parts by a partition so adjusted as to cause a continued circulation of the heated air within, and hence an equable heating of the outer case. It was one point in Dr. Arnott's system to make the stove self-regulating, by providing apparatus whereby the valve would open and shut at the proper times to maintain any required temperature.

Numerous varieties of the close stove, bearing more or less on the above construction, have been brought forward since the publication of Dr. Arnott's book. Each professes to possess some peculiar merit; but all present these features in common—that the air-hole by which the combustion is fed is very small, and capable of adjustment; that there is a body of air to be warmed, external to the grate or fire-box itself, but confined within an outer case; that the consumption of fuel is much smaller than in any variety of open fire-places; and that the flue for carrying off the smoke and gases is small in diameter, and capable of being carried in any direction. In the different forms of 'kitchen-ranges' the open fire-place is combined with what may be deemed a close stove; for the 'oven' and 'hot-closet' are representatives of the heated space within the outer case of a close stove. The 'gas-stoves' and 'steam-kitchens' of modern inventors may in like manner be included in the same category, for they are in effect close stoves heated by agents different from common coal.

In the arrangements above described, the stove is in the room which is to be warmed, and its heating effects are calculated with respect to that room alone; but in many factories and other large establishments the fire is in an outer or lower apartment, and the heated air is conveyed thence in a pipe to the apartment to be heated.

The employment of steam-boilers in large establishments where steam-engines are worked, is one of the circumstances which have led to the very extensive adoption of the method of warming by steam. A marked difference is observable in the principle of this method, as compared with that of hot-air warming. The steam is not permitted to mingle with the air of the room which is to be warmed, but acts through the medium of the metallic tube which confines it, and which it raises to a temperature sufficient to warm the room. The efficacy of this mode of heating depends on the great capacity for heat which steam possesses, a capacity equal to 1000°; that is, a pound of water at 212° will absorb a thousand degrees of heat in becoming a pound of steam. Mr. Scott Russell calculates that a room containing 500 cubic feet of air, and exposing 400 feet of surface, may be maintained at a temperature of 20° above that of the air without—that is to say, at 60° in the inside of the room when the atmosphere is at 40° without—for a space of twelve hours, by the evaporation of two gallons of water, and at the expense of about three pounds of coal. This mode of heating buildings is adopted to a very large extent in the steam-power factories.

The method of heating by hot water, though not so much adopted in factories as the steam method, is perhaps of more extensive application in other buildings. Where all the apartments to be warmed are on one level, an open boiler may be used; but where it is necessary to carry the pipes to different floors of a building, some of them much above the level of the boiler, the boiler must in that case be closed. When an open boiler is employed, a pipe branches out from the upper part of the side, extends horizontally through the rooms to be warmed (without in any case rising above the level of the water in the boiler), and returns again to the boiler, which it enters at a lower level than the other. Under this arrangement a current of heated water will flow from the boiler at the upper orifice, and, after traversing the tube, return to the lower orifice. The closed boiler is however more extensively useful, since it enables all the stories of a building to be warmed by one apparatus. The whole system, including both tubes and boiler, is filled with water at a valve at the highest point; and when heat is applied to the boiler, a circulation ensues which speedily causes the whole length of tubing to become hot. Various modifications of this hot-water system are adopted in the new Houses of Parliament, in the British Museum, and other public buildings.

Ventilation.—There is an important but often neglected circumstance attending the artificial warming of buildings, viz. that the amount of fresh air, requisite under any condition for animal respiration, must be more and more increased in proportion to the fuel burned in the room; or, more correctly, there must be one portion of air to feed combustion, and another portion to aid respiration. Tredgold, Arnott, Reid, and others, have calculated the quantity of air required for these purposes. Tredgold states that when a room containing several persons is heated to the average and customary degree, it will be necessary to supply four times as many cubic feet of fresh air per minute, as there are persons in the room; that is, four feet for each person. But there must

be an outlet for the vitiated air equal to the inlet for pure air; and as it is found that respired air ascends to the upper part of the room, it follows that the ceiling or some neighbouring part is the proper place for an outlet.

In ordinary English houses no steps whatever are taken to regulate either the supply of pure air or the exit of vitiated air; but it is probable that our large fire-places regulate this matter tolerably well. In crowded rooms however, where the amount of vitiated breath bears a much larger ratio to the cubical contents, and where the doors are generally small compared with the height of the room, the impure air cannot escape by these means, and some arrangements must be made near the ceiling for the removal of the air. These methods are chiefly of two different kinds; the one by the use of a revolving wheel or fan-ventilator, and the other by the action of a chimney or tube. At the Reform Club-House, London, a steam-engine works a revolving fan, capable of throwing eleven thousand cubic feet of air per minute into a subterranean tunnel under the basement story; and the steam from the small steam-engine which works the fan, supplies three cast-iron chests with the requisite heat for warming the whole building.

The second mode of effecting ventilation, viz. by the use of a tube or chimney opening into the air from the upper part of an apartment, depends for its action on the ascensive power possessed by a lofty aërial column. As the heated air of a furnace-chimney carries up the smoke, &c., more rapidly if the chimney be very lofty, so does a lofty chimney exceed a low one in carrying off vitiated air; and for the same reason, even if no chimney, properly so called, be provided, a lofty room, furnished with appropriate openings in its ceiling, will furnish a draught to carry off impure air more rapidly than a low room; and in many of our public buildings this arrangement is deemed sufficient.

Dr. Arnott has made use of the ascending force of the column of heated air in an ordinary chimney as a means of ventilating ordinary sitting-rooms, by placing a balanced valve in an opening from the room into the chimney. He has also introduced very recently a mode of ventilating large buildings by applying the pressure of a column of water to work a forcing air-pump. Many forms of ship-ventilation depend on the use of an air-pump.

WARMINSTER. [WILTSHIRE.]

WARNER, WILLIAM, a native of Oxfordshire, is supposed to have been born about 1558. He was a student at Oxford, but left the university without a degree, and, going to London, became an attorney in the Common Pleas. He died suddenly in 1609. He was the author of 'Albion's England,' an historical poem, or rather a collection of ballads, in thirteen books, in the Alexandrine stanza. This work, in his own time, was popular, and was frequently reprinted in the course of the thirty years after 1586, when it was first published. The whole poem, reprinted, is in Chalmers' 'British Poets.' Warner was also the author of 'Syrinx, a Seavenfold Historie,' a collection of prose stories, published in 1597; and he is supposed also by Warton and others to have been the writer of a translation of the 'Menœchmi' of Plautus, which first appeared in 1595, and was reprinted by Steevens in 1779, in his 'Six Old Plays, on which Shakspeare founded,' &c.

WARNER, RICHARD, of Woodford, in Essex, was the author of the 'Plantæ Woodfordienses,' which was published in 1771. He was born in 1711, and was educated at Oxford. He was from early life much attached to the study of botany, and, having a fortune at his command, he bestowed much pains in collecting and cultivating exotic plants. He died April 11, 1775. He possessed a valuable library, which he bequeathed to Wadham College, Oxford. Warner translated some of the comedies of Plautus. [THORNTON, BONNEL.]

WARNE'RIA, a genus of plants named by Miller in honour of Mr. Warner. This genus, which is now called *Hydrastis*, has but a single species. It belongs to the natural order *Ranunculaceæ*. The only species is called *H. Canadensis*. It is a native of North America, in watery places in tracts along the Alleghany Mountains, from Canada to the Carolinas. The head of its fruit very much resembles that of the raspberry.

WARNETON. [FLANDERS, WEST.]

WARRANT. A warrant is a delegation by A, who has power to do some act, of that power to B. A sheriff who has power to arrest, &c., may give a warrant to his bailiff to act for him. A landlord who has power to make a distress upon his tenant may give a warrant of distress to another for that purpose. A magistrate who has authority to bring before him persons who are within his jurisdiction, and reasonably suspected of having committted certain offences, may make a warrant to others to do that act. A warrant should be in writing, and ought to show the authority of the person who makes it, the act which is authorised to be done, the name or description of the party who is authorised to execute it, and of the party against whom it is made; and in criminal cases, the grounds upon which it is made. The sense in which the word warrant is more generally known relates to criminal matters. The warrant should always be under the hand and seal of the justice who gives it; and it should be addressed to the constable or constables, or to some private person by name; and the constable or the private person acting within the justice's jurisdiction will not be liable for any of the consequences of obeying a proper warrant. The warrant must name the person against whom it is directed. A warrant to apprehend all persons suspected, or all persons guilty, &c., is illegal; for the pointing out of the individual person to be apprehended is the function of the justice, not of the officer. The warrant should also set forth the time and place of making it, and the cause for which it is made. A warrant may be to bring the party before the justice who grants it, or before any justice of the same county. A warrant of a justice of one county cannot be executed in another until it has been backed, that is, signed by some justice in

that other county; and the same provision has been also enacted with respect to warrants granted in any one of the three kingdoms, and requiring to be executed in any other. But a warrant granted by one of the judges of the Court of Queen's Bench is tested England, and may be executed in any part of the kingdom. A warrant is in force until it has been executed, if the justice who granted it be still alive. After the party is apprehended, the officer ought forthwith to carry him wherever he is directed by the warrant. Much of what has been said as to a warrant of apprehension is equally applicable to a Warrant of Commitment, by which a justice authorises a commitment of a party to prison, either to suffer a summary punishment or to await his trial. A Search Warrant is a document which authorises a search to be made for stolen goods.

A Warrant of Attorney is a writing by which a man authorises another to do an act for him, as his agent or deputy. [LETTER OR POWER OF ATTORNEY.] But the term is most commonly applied to cases where a party executes an instrument of that name, authorising another to confess judgment against him in an action for a certain amount named in the warrant of attorney. [COGNOVIT.]

WARRANTY. The doctrine of *warranty of lands* was formerly an important part of legal learning, but the effect of warranties having been gradually reduced within very small compass, the subject has now become of little practical use. Still it is necessary for those who would properly understand the English law of real property to pay some attention to this difficult subject. All the learning upon the subject is contained in 'Coke upon Littleton,' with the notes of Hargrave and Butler.

As to things personal, a purchaser of goods and chattels may have satisfaction from the seller, who sells them as his own, and whose title is defective, without any express warranty, if there be any fraudulent misrepresentation or concealment by the vendor; but it seems not otherwise. But the vendor is not answerable for the quality of the wares, unless he warrants the quality, or unless he knew the quality to be not sound and good, and has used art to disguise the defects, or has misrepresented them to the buyer. No particular form of words is necessary to make a warranty. There also may be warranty by implication, as when goods are sold by sample. The various rules as to warranty may be found in books which treat of contracts.

WARREN. A Free Warren is a franchise which gives a right to have and keep certain wild beasts and fowls, called game, within the precincts of a manor, or any other place of known extent, whereby the owner of the franchise has a property in the game, and a right to exclude all other persons from hunting or taking it.

It does not appear that the crown ever had the right of granting free warren to one person over the lands of another. The right exists by prescription. The franchise of free warren still exists in some places in England, and is justly viewed as an intolerable remnant of feudalism.

WARREN, SIR JOHN BORLASE, Bart., was born in 1754, at the family-seat of Stapleford, in Nottinghamshire. While at Winchester school he ran off and joined a king's ship, upon which his friends procured him an appointment as a midshipman; and in this capacity he served for some time. Returning to England, he entered Emmanuel College, Cambridge. He took his degree of M.A. in 1776. Before this, in 1774, he was returned to parliament for the borough of Marlow, and in 1775 was created a baronet. Soon after he returned to sea, and, serving with Lord Howe in America, as a lieutenant on board the Nonsuch, was in 1779 made master and commander of the Helena sloop of war, and in 1781 received his commission as post-captain. He was re-elected for Marlow in 1780. On the breaking out of the war of 1793 he was appointed to the Flora frigate, and in this and other ships greatly distinguished himself. In 1794 he received the ribbon of the Bath. In 1795 he acted as commodore of the division of ships which effected the debarkation at Quiberon Bay, intended to assist the royalists of La Vendée. In 1797 he removed into the Canada, of 74 guns; and being soon after detached to the coast of Ireland, he fell in with the French naval force intended for the invasion of that country, and obtained over it a signal victory, capturing the whole squadron, consisting of a ship-of-the-line and three frigates, Oct. 11, 1798. For this important service he received a vote of thanks from both houses of parliament, and was made a rear-admiral of the blue. Meanwhile at the general election of 1796 he had been returned as one of the members for the town of Nottingham; and he was re-elected for the same place in 1802. After the peace of Amiens Sir J. B. Warren was made a privy councillor, and sent out as ambassador extraordinary and minister plenipotentiary to St. Petersburg, where he conducted some important negociations with great ability. On the breaking out of the war with America in 1812, he commanded for a short time on that station; but this was his last service. He died at Greenwich Feb. 27, 1822.

WARRINGTON. [LANCASHIRE.]

WARSAW, formerly the capital of all Poland, now of the Russian kingdom of Poland, and of the government of Mazovia, is situated on an eminence above the left bank of the Vistula, in 52° 10′ N. lat., 21° E. long., and has a population of 166,997. It consists of the city itself, which is divided into the Old and the New Town, and of several suburbs, one of which, Praga, is on the right bank of the Vistula. The city is not regularly fortified, but it is surrounded with lines, and since the rebellion of 1830 a very strong citadel has been erected, which completely commands it. The circumference of the city and suburbs is 10 miles, but there are, however, many gardens and fields in this area. The city itself is irregularly built and the streets narrow, but the suburbs are distinguished by wide well-paved streets and regular buildings. Among the public buildings are—the royal palace, built by King Sigismund III., who transferred his residence from Cracow to Warsaw; the Saxon palace, with

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a fine garden; the palace, formerly the residence of the primate, since occupied by the commissariat department; the Krasinski palace, a very fine building, now the palace of the government; the palaces formerly belonging to Prince Radzivil and Count Brühl; the buildings of the suppressed university; the arsenal; the new mint; Marieville, an imitation of the Palais Royal at Paris; the military hospital; and the great barracks. There are besides above a hundred palaces of the Polish nobles, several convents with churches, the cathedral, the churches of the Holy Cross, of St. Alexander, and St. Borromeo, and the beautiful Lutheran church. Warsaw has five theatres, and numerous useful and charitable institutions, a National Bank, established by order of the Emperor Nicholas in 1828, a foundling hospital, six other hospitals, an agricultural academy, a deaf and dumb asylum, and numerous schools. The manufactures are of many different kinds, and the trade of the city is considerable, being favoured by the Vistula, and it has five annual fairs. Before the Cracow gate stands a gilt bronze statue of King Sigismund III. on a marble column 26 feet high. The Emperor Nicholas caused a splendid monument to be erected in the church of the Capuchins, in honour of King John Sobieski. In 1830 a statue of Copernicus was erected before the Academy of Sciences, and another in honour of Prince Poniatowski, who fell at the battle of Leipzig, was put up in the Cracow suburb. Warsaw is connected by railways with Vienna and Berlin, from each of which it is distant about 340 miles in a straight line.

WARTON, JOSEPH, D.D., the eldest son of the Rev. Thomas Warton, professor of poetry in the university of Oxford, was born at Dunsford, in the house of his maternal grandfather, in 1722, and at the age of 14 was admitted on the foundation of Winchester College, whence he went to Oriel College, Oxford, in 1740. Having taken his degree of B.A. in 1744, he was ordained to the curacy of his father's vicarage of Basingstoke; and here he officiated till he removed, in Feb., 1746, to Chelsea, where he was curate for about a year. After this he held for a few months the curacy of Chawton and Droxford, in Hampshire, and then returned to Basingstoke. In 1748 he was presented to the rectory of Winslade, in the neighbourhood of Basingstoke. Warton had, with his schoolfellow Collins, been at an early age a poetical contributor to the 'Gentleman's Magazine.' His next printed composition appears to have been his ode entitled 'Superstition,' which he sent to Dodsley's 'Museum,' in April, 1746. The same year he published a volume of odes and other poems. In this or the next year he joined his brother Thomas in publishing by subscription a volume of his father's poems. In 1749 appeared his 'Ode to Mr. West' (Gilbert West, the translator of Pindar).

In 1751 Warton accepted the invitation of the Duke of Bolton to accompany him on a tour to France. After his return to England, Warton published an edition of Virgil, accompanied with a new verse translation of the 'Eclogues' and 'Georgics' by himself, and one of the 'Æneid' by Christopher Pitt. The work, which appeared in 1753, brought Warton great reputation at the time; and is stated to have been the ground upon which he was honoured by the university of Oxford with a diploma of M.A. in 1759.

Among the most popular of Warton's literary performances are some papers on critical subjects, which he contributed to the 'Adventurer,' in 1753. In 1754 he was instituted to the living of Tunworth; in 1755 he was elected second master of Winchester School; and in 1756 his friend Sir George Lyttleton, on being made a peer, nominated him one of his chaplains. He published, in 1762, the first volume, in 8vo., of the work by which he is principally known, his 'Essay on the Writings and Genius of Pope.' Its conclusion, in a second volume, did not appear till 1782.

In 1766 Warton became head master of Winchester School, upon which occasion he visited Oxford, and took his degrees of Bachelor and Doctor in Divinity. In 1782 the Bishop of London gave him a prebend of St. Paul's, and the living of Thorley, in Hertfordshire, which he afterwards exchanged for Wickham. In 1788 he obtained a prebend in Winchester Cathedral, and, through Lord Malmesbury, the rectory of Easton, which he was soon after permitted to exchange for Clapham. In 1793 he resigned the mastership of Winchester School. After this he undertook an edition of Pope's works with notes, which he completed in 9 vols. 8vo., in 1797. It was followed by the commencement of a similar edition of Dryden, of which he lived only to publish 2 volumes. He died Feb. 23, 1800.

WARTON, THOMAS, the younger brother of Dr. Joseph Warton, was born at Basingstoke in 1728. He was admittted a commoner of Trinity College, Oxford, in March, 1743. He was soon after elected a scholar, took his degree of M.A. in 1750, succeeded to a fellowship in 1751, and spent the rest of his life in his college, employing his time partly as a tutor, partly in literary occupations.

The first production that brought him into much notice was his 'Triumph of Isis,' published in 1749, in reply to Mason's poem of 'Isis,' which was a satire upon the loyalty of Oxford. In 1750 he contributed a few pieces to 'The Student, or Oxford and Cambridge Miscellany,' amongst which was his 'Progress of Discontent,' one of the happiest of his humorous effusions. The next year he published his satire entitled 'Newmarket,' and some other pieces in verse. In 1753 he edited a small volume, which appeared at Edinburgh, with the title of 'The Union, or Select Scots and English Poems,' among which were several of his own. In 1754 he published, in an 8vo. volume, his 'Observations on the Faerie Queene of Spenser.' It was extended to 2 volumes in a second edition, which appeared in 1762.

In 1757 Warton was elected professor of poetry. During the next ten years he published several small works, edited others, contributed to the 'Biographia Britannica,' 'The Idler,' &c. He took his degree of B.D. in 1767, and in 1771 he

was instituted to the small living of Kiddington, in Oxfordshire. This and the donative of Hill Farrance, in Somersetshire, to which he was presented by his college in 1782, were Warton's only ecclesiastical preferments. In 1774 he published the first volume, in 4to., of his great work, 'The History of English Poetry.' A second volume appeared in 1778, and a third in 1781; it remains however unfinished. Warton made a collection of those of his poems which he thought worthy of preservation, and published it in 1777; and other editions followed in 1778, 1779, and 1789. He was made poet-laureate on the death of William Whitehead; and the same year he was elected Camden Professor of History at Oxford. He died May 21, 1790. A Life of Warton was prefixed to a new edition of his poems, by Mr. Mant, in 1802.

WARTS, the name of small tumours or excrescences which occur on the cuticle. Like all other epidermoid tumours, they are unorganised in their origin and course. They are generally of a conical form, embrace only a small extent of surface, are hard, insensible, and in colour are usually darker than the surrounding surface. In structure they have a radiated character. Their growth is slow, and they derive their nutriment from the cutis over which they lie. The parts of the body on which these excrescences most frequently occur are the hands and face, although they are by no means confined to these localities. They are of an innocent character, and produce no ill consequences, except by pressure, when they occur in such parts as between the fingers and toes or on the eyelids.

When stimulated strongly, they generally get smaller or disappear altogether. Hence the best mode of treatment is the application of stimulants, such as nitrate of silver or strong acetic acid.

WARWICK. [WARWICKSHIRE.]

WARWICK, GUY, EARL OF. Several of our mediæval chroniclers speak of this famous personage as having without doubt actually existed: he may now however be considered as belonging not to history, but to fable and romance. Camden was perhaps one of the first inquirers among us, if not the very first, who ventured to intimate so much, in his account of the Earls of Warwick in his 'Britannia' (Warwickshire). Even as a hero of romance Guy can scarcely be traced with certainty to a more remote date than the earlier part of the 14th century. An account of the romance of Guy of Warwick, with copious extracts, is given in Ellis's 'Metrical Romances,' vol. ii., pp. 3–94. For a compendious summary of the hero's exploits, the reader may turn to the 'Legend,' printed by Percy, or to the 12th and 13th songs of Drayton's 'Polyolbion.' The modernised prose abridgment of Sir Guy of Warwick used to be a common stall pamphlet.

WARWICK, RICHARD NEVIL, EARL OF, called the 'Kingmaker.' [EDWARD IV.]

WARWICKSHIRE, a midland county of England, is bounded N. for a very small space by Derbyshire, N.E. by Leicestershire, E. by Northamptonshire, S.E. by Oxfordshire, S. and S.W. by Gloucestershire, W. by Worcestershire, and N.W. by Staffordshire. The greatest length N. to S. is 50 miles; the greatest breadth E. to W. is 33 miles. There is a detached portion of the county on the W. wholly enclosed by Worcestershire, in the neighbourhood of Bromsgrove; and another detached portion on the S.W., near Shipston-on-Stour, surrounded by portions of Worcestershire and Gloucestershire. The county is situated between 51° 58′ and 52° 42′ N. lat., and between 1° 10′ and 2° W. long. The area is 897 square miles. The population in 1841 was 401,715.

Surface and Geology.—Warwickshire has no lofty hills, but the whole county is occupied by gentle hills of moderate elevation with intervening vales. The south-eastern border is skirted by hills composed of the lower formations of the oolitic series, overlooking the valley of the Stour and the Vale of Red Horse, so called from a colossal figure of a horse carved in the ferruginous sands of the slope of Edge Hill, now obliterated by the progress of inclosures, and replaced by one of much smaller dimensions. There are extensive quarries of gritstone, part of the oolitic series, on Compton Hill. The valley of the Stour and the Vale of Red Horse, which skirt the foot of the oolitic hills, are occupied by the beds of the lias formation. The rest of the county, with one or or two exceptions, is occupied by the formations of the red marl and new red sandstone group; and forms part of the great midland red marl and new red sandstone district. There is one coal-field in Warwickshire: it extends in length 16 miles S.S.E. to N.N.W from Wyken and Sow, two villages near Coventry on the E., to the border of Staffordshire near Tamworth: it has an average breadth of about three miles.

Rivers, Canals, and Railways.—The greater part of Warwickshire belongs to the basin of the Severn; a considerable portion in the N. is included in the basin of the Trent, and a small portion to the S.E. in the basin of the Thames. No part of the course of the Severn is in Warwickshire: the drainage of the county is conveyed into it by the Avon, one of its most important tributaries. The Avon rises in Northamptonshire, and enters Warwickshire under Dove Bridge, about 12 miles from its source. From Dove Bridge it flows in a winding channel W. and S.W. to Warwick, passing through Warwick Castle Park, thence S. and S.W. to Stratford-upon-Avon; and thence, partly within, partly upon the border of the county, till it quits the county just above Harvington Mill. Its course through the county is altogether 57 miles. The total length of the Avon in round numbers is 100 miles. The navigation does not extend above Stratford, so that it is navigable only for 42 miles, or less than half its course. The feeders of the Avon are, the Swift (10 miles long), the Sow (20 miles), the Leam (30 miles), the Dene (13 miles), the Stour (24 miles), and the Arrow (18 miles).

That part of the county which belongs to the basin of the Trent is drained by the Tame, which rises about 3 miles N.W. from Walsall in

Staffordshire, flows S.E. to Aston, near Birmingham, above which it enters Warwickshire. It then flows E.; afterwards turning N. it quits Warwickshire at Tamworth, and flowing still N., enters the Trent at Alrewas in Staffordshire. Its whole course is about 44 miles, of which 22 miles are in Warwickshire or on the border. The feeders of the Tame are, the Rea (12 miles long), the Blythe (18 miles), the Bourne (10 miles), and the Anker (26 miles). Neither the Tame nor any of its affluents are navigable.

The deficiency of river navigation, which in Warwickshire is limited to a small part of the course of the Avon below Stratford, is compensated by the number and importance of its canals. The Grand Trunk, or Trent and Mersey Canal, which follows through Staffordshire and Derbyshire the course of the Trent, and the first act for which was obtained in 1766, may be considered as having given the first impulse to the canal navigation of Warwickshire, though no part of the Grand Trunk is within that county. In 1768 the first act was obtained for the Coventry Canal, which commences in the Grand Trunk Canal, near Alrewas, in Staffordshire, and extends to Coventry. The whole length of the canal is nearly 38 miles, 27 of which are in Warwickshire. The Oxford Canal was commenced under an act obtained in 1769. It commences in the Coventry Canal at Longford, and opens into the Thames at Oxford. The whole length of this canal is about 84 miles; of which about half is in Warwickshire, or in Northamptonshire. The other canals of less importance are, the Ashby-de-la-Zouch Canal (26 miles long, 5 miles of which are in Warwickshire); the Birmingham Canal, now called the Old Birmingham Canal (22 miles long, including its branches, and belonging chiefly to Staffordshire, little more than 2 miles being in Warwickshire); the Birmingham and Fazeley Canal (15 miles long, 2 of which are in Staffordshire); the Worcester and Birmingham Canal (29 miles long, only the 3 miles nearest to Birmingham in Warwickshire); the Stratford-upon-Avon Canal (23 miles long, by far the greater part belonging to Warwickshire); the Warwick and Birmingham Canal (22 miles long); and the Warwick and Napton Canal (14 miles long).

The London and North-Western Railway at Rugby divides into two branches, one of which passes through Tamworth and the other through Birmingham. Branch railways extend from Coventry S. to Warwick, and N. to Nuneaton. Other branches extend from Birmingham and from the Hampton station on the Coventry and Birmingham line northwards through Tamworth into Derbyshire.

Agriculture.—This county, being situated nearly in the centre of England, has a comparatively mild and healthy climate. Except in the higher and more exposed situations, where the soil is cold and heavy, the harvest is as early as in more southern counties.

The soil varies extremely, so that two or three different kinds of soil are often found in a field of no great extent. The red loam, which is found to a considerable extent across the centre of the county, and especially between Warwick and Coventry, and from the borders of Worcestershire to Leicestershire, is mostly of a superior quality; all of it very fit for white crops, and much of it capable of bearing both beans and turnips. Where the loam inclines to sand, the subsoil is chiefly limestone, marl, or sandstone; and under the colder and heavier loams the substratum is clay. There is also a fertile clay on limestone.

On the light loams and sands turnips have been long cultivated. There is a great extent of excellent pasture-land in Warwickshire, and though some of it is very capable of being converted to arable land, and farmed on the convertible system of husbandry, the landlords do not readily give their tenants leave to break up old sward.

On the heavy lands in this county, as in most others, the custom of continually ploughing from the crown and gathering the furrows, as it is called, had produced such high ridges that a man might be hid behind them; and the water always running down the steep sides of the ridge, made a kind of morass in the deep intervals. Most of these high ridges however have since been levelled, and a better system of ploughing introduced. Thorough-draining has not yet made much progress in this county; but where the subsoil is clay it will no doubt soon become universal. The great superiority of the rich loams lying on sandstone arises in part from being under-drained by nature, without which all their natural fertility would have been of little advantage.

At one time the forest of Arden occupied a large portion of the centre of the county, which is still extremely well-wooded.

There is no breed of cattle peculiar to the county. The dairy cows are chiefly long-horns, crossed in every possible way. The old Warwickshire sheep is nearly forgotten, having been superseded by the New Leicester and a cross of the two breeds: for folding, the South Downs are preferred.

Divisions and Towns.—Warwickshire is divided into 4 hundreds. It is in the diocese of Worcester, and comprehends the archdeaconry of Coventry, and part of the archdeaconry of Worcester. It is in the Midland Circuit, and the assizes are held at Warwick and Coventry. For parliamentary purposes it is divided into North Warwickshire and South Warwickshire, each of which returns 2 members to parliament; in addition to which Coventry, Warwick, and Birmingham, return each 2 members: total, 10 members.

The following are the principal towns, with the population of each in 1841:—

Alcester. [ALCESTER.]

Atherstone, a market-town, 14 miles N. by W. from Coventry, consists of a single street. There is a modern market-house. The church is ancient. The chief manufactures are of hats, ribbons, and shalloons. Population, 3743.

Birmingham. [BIRMINGHAM.]

Coleshill, a market-town, 10 miles E. by N. from Birmingham, and 18 miles N.N.W. from Warwick, is situated on an eminence, at the foot of which the river Cole flows, and consists prin-

cipally of one long street, with a number of respectable and some spacious and handsome houses. The church is on a lofty site, and has a square western tower, with buttresses, surmounted by a crocketed spire of late perpendicular character. It contains a font of Norman architecture, and is rich in monuments, especially of the Digby family. The river Blythe flows near the town on the east side. Population of the parish, 2172.

Coventry. [COVENTRY.]

Henley-in-Arden, a market-town, 10 miles W. from Warwick, is situated on the road between Stratford-on-Avon and Birmingham, and consists principally of one long street. The houses, though mostly ancient, are well built; and there are some of more modern date interspersed. The chapel is small but of good perpendicular character, with well-executed details. Population of the chapelry, 1223.

Kenilworth, a market-town, 4 miles N. from Warwick, consists principally of one long street, extending nearly a mile along the road from Coventry to Warwick; another street leads towards the castle, and near this street is the church. Many of the houses are very neat; the church has some remains of ancient architecture, especially a fine and much enriched western door of Norman architecture, in the lower part of an ancient tower surmounted by a spire of more modern date. But the most interesting object in the place is the castle, the ruins of which are extensive: they are principally of late perpendicular character, but there are some Norman portions. The most ancient part is an old tower called Cæsar's Tower, of which three sides remain, with walls in some parts 16 feet thick. The large and massive additions of John of Gaunt, known as Lancaster Buildings, are in different stages of decay; and the additions of the Earl of Leicester, though of comparatively modern date, present, from the friable nature of the stone of which they are built, an appearance of great antiquity. They are called the Leicester Buildings. They contain the ruins of the noble banqueting hall, 86 feet long by 45 wide. The gate-house erected by the same earl is in better preservation. The magnificent entertainment given here by Leicester to Elizabeth has been made familiar to the general reader by Sir Walter Scott's romance of 'Kenilworth.' After the civil war of Charles I., the castle was dismantled. There is an ancient stone bridge over a brook flowing into the Avon. Population of the parish, 3149.

Kington, a market-town, 11 miles S. by E. from Warwick, is irregularly built, and the houses are chiefly old, of stone, and thatched. There is an old market-house. The church, which has some ancient portions amid many alterations, has a square embattled tower. The market is almost disused. Population of the parish, 966.

Leamington, or *Leamington-Priors,* 2 miles E. from Warwick, has, from a village, in about 35 years become a large and wealthy market-town and watering-place. It is built on both banks of the Leam, but chiefly on the north bank, and occupies the bottom and slopes of a wooded valley. The main streets are broad and straight, and composed of handsome dwelling-houses, shops, hotels, and public buildings. The old well or spring noticed by Camden has a neat pump-room erected over it. Since 1784 new springs have been discovered, and in connection with these other establishments for drinking the waters or bathing, of which the Royal Spa is the principal, have been formed in different parts of the town. These establishments have hot, cold, vapour, and shower baths, and pump-rooms. There is a handsome building comprehending a public library and reading-rooms, with an assembly-room above; another assembly-room has card, music, billiard, and refreshment rooms attached; and there are a museum and picture-gallery; a theatre; a public promenade called the Ranelagh Gardens; a botanical garden; a parish church, which retains some old portions amid various mutilations and alterations; a modern episcopal chapel; places of worship for Independents, Methodists, and Roman Catholics; a national school; and baths for the poor. The Warwick and Napton Canal passes through the Old Town. Population of the parish, 12,859.

Nuneaton, a market-town, 9 miles N. by E. from Coventry, is irregularly laid out, but tolerably well built. The river Anker runs through it. The church is a gothic building, with a square tower. The chief branch of industry in the town and neighbourhood is the ribbon-manufacture. The coal-field, which extends from Tamworth to Coventry, passes through the parish, and there are some coal-pits. Population of the township, 4624.

Rugby, a market-town, 16 miles N.E. from Warwick, stands on an eminence near the south bank of the Avon, and consists of several streets irregularly laid out, containing a number of well-built and handsome houses. The importance of the town is chiefly derived from its grammar-school, founded in 1567. The school buildings form a quadrangle, enclosing a court 90 feet long by 75 feet wide, surrounded on three sides by open cloisters. The buildings are in the Elizabethan style, of white brick, with the angles, cornices, and dressings to the openings and windows, of Attleborough stone. They were erected early in the present century. There is also a chapel erected since the completion of the other buildings. Rugby church has a square western tower without buttresses and devoid of ornament. Population of the parish, 4008.

Solihull, a market-town, 7 miles S.E. from Birmingham, consists of two principal streets, nearly parallel to each other, and of two or three smaller connecting streets or lanes. The houses are generally modern and well built, and some of them are handsome. The church, which is on the south side of the town, is a large and curious cross church. Population of the parish, 3041.

Southam, a market-town, 12 miles S.E. by S. from Coventry, lies in a valley, watered by a small stream which flows into the Ichene, just below the town. It contains a number of modern well-built houses. The church is of various dates. It has a western tower and spire.

Stratford-upon-Avon, a market-town and muni-

cipal borough, 8 miles S.W. by S. from Warwick, is situated on the W. bank of the Avon, which is here crossed by a long stone bridge. The town slopes gently towards the river, which is here a copious but sluggish stream. The town-hall was built in 1768. The house in Henley Street, in which Shakspere was born, has been purchased for the nation by subscriptions and other means. The parish church, in which he was buried, and which contains his monument and effigy, is large and handsome, with a central tower. New Place, the house in which Shakspere resided in his latter years, was pulled down in 1759. The town contains a neat theatre. The municipal borough is governed by 4 aldermen, one of whom is mayor, and 12 councillors. Population of the township, 3321.

Sutton-Coldfield, a market-town, 7 miles N.N.E. from Birmingham, has a neat appearance, and contains some handsome houses. The church is handsome, and comprehends a nave, with side aisles, and chancel. The nave is modern. The town-hall is a neat brick building. South-west of the town is the 'Coldfield,' a bleak and cheerless tract of 13,000 acres, extending into Staffordshire; and N.W. and W. of the town is Sutton Park, containing about 3500 acres, granted to the poor of the town as pasturage by Bishop Vesey. Population of the parish, 4300.

Warwick, the county-town, a municipal borough, and a parliamentary borough, 93 miles N.W. from London by the road, and 103 by the North-Western Railway, through Coventry, is situated on the right or N.W. bank of the Avon, from which nearly the whole of it is divided by Warwick Castle and the castle-grounds. A stone bridge of one arch of 105 feet span crosses the river above the castle. The town stands on a sandstone rock, in which the cellars are excavated. The streets are irregularly laid out. The central and older part of the town is the best part; it is high, dry, and healthy. The houses upon the sides and near the base of the hill are crowded, of a mean description, damp, and unhealthy. The town is lighted with gas. The castle is one of the finest specimens in the kingdom of the ancient residences of the nobility. The apartments have been modernised, but the outward arrangement and form of the building have sustained little alteration. St. Mary's Church, built on the site of an older structure in the 14th century, and in great part rebuilt after a fire in 1694, which destroyed a large portion of the town and of the church, is in the centre of the town. It is a cross church, of which the choir and its adjuncts, especially the chapel of St. Mary, usually termed Beauchamp Chapel, are ancient; the nave and transept are modern. The choir has a finely-designed and beautifully-worked stone ceiling, and ranges of stalls on each side. The chancel is an uncommonly beautiful specimen of perpendicular work. The Beauchamp Chapel is completely enriched both within and without; its details are of the most elegant character, of excellent execution, and in very good preservation. In the centre of the chapel is a very rich altar-tomb, with the figure of Richard Beauchamp, earl of Warwick, whose executors erected the chapel according to the directions of his will; and there are some monuments of later date. St. Nicholas's Church is modern, neat in the interior, but small and devoid of architectural beauty. The town contains a spacious and handsome county-hall; a large modern gaol, adjoining the county-hall; a county house of correction; a town-hall; a theatre; and a market-house. There is an interesting old almshouse, for a master and 12 brethren (poor men), constructed by the Earl of Leicester, the favourite of Queen Elizabeth, out of the buildings of two ancient guilds. It is called the Leicester Hospital. The endowment is of considerable value; the master has a salary of 400*l.* per annum, and each of the brethren (who have been increased to twenty) 80*l.* per annum. An ancient place of worship, called St. Peter's Church, over the east gate of the town, is now used as a free-school; and there are some places of worship for dissenters. Some worsted and cotton and lace manufactures are carried on at Warwick. There are malthouses, and lime, timber, and coal wharfs on the bank of the Warwick and Napton Canal. The municipal borough is divided into 2 wards, and is governed by 6 aldermen, of whom one is mayor, and 18 councillors: population, 9775. The parliamentary borough returns 2 members: population, 9124.

History and Antiquities.—In the earliest historic period this county appears to have been on or near the border of the three nations, the Cornabii, the Coritani, and the Dobuni. In the Roman division of Britain, Warwickshire was included in the province of Flavia Cæsariensis. Several Roman or other ancient roads cross the county or pass along its borders. Some Roman towns and stations, in the county or on the border, may be identified. Roman coins or other antiquities have been found near Birmingham, Hampton-in-Arden, Willoughby near the Leam, on the eastern border of the county, and at Warwick; and a Roman pavement at Coventry.

In the earlier Saxon period Warwickshire formed part of the kingdom of Mercia. Under King Alfred, Warwickshire came, with the rest of Mercia south-west of the Watling Street, into direct subjection to the West Saxon crown (about A.D. 886), and during part of the reign of Alfred and his son Edward the Elder was governed by the Alderman Æthered, and after his death by his wife, Ethelfleda, Alfred's daughter. During this and the subsequent reigns it was the scene of war with the Danes or Northmen.

In the civil war of Charles I. the county generally embraced the cause of parliament, being especially swayed by the influence of Lord Brooke. The first great battle of the war was fought in 1642, at Edge Hill. Warwick Castle, the principal post of the Parliamentarians, was attacked by the Royalists in the early part of the war, but without success.

WASHINGTON, a city in the District of Columbia, the capital of the United States of North America, and the seat of Congress, is situated on the left bank of the Potomac, and on the right bank of the Anacostia, or Eastern

Branch, in 38° 53′ 34″ N. lat., 77° 1′ 30″ W. long., 295 miles from the sea by the course of the river and bay. The city occupies a space a little over 8 square miles. The population in 1840 was 23,364.

Washington is separated from George Town by Rock Creek, over which are 2 bridges. A pile-bridge, more than a mile long, crosses the Potomac, and leads to Alexandria. There is also a bridge over the Anacostia, which river admits frigates to ascend to the navy-yard. Vessels drawing 14 feet of water can ascend to the Potomac Bridge. Washington Canal extends from the Anacostia through the city to the Chesapeake and Ohio Canal.

The city stands on a point of land between the Potomac and Anacostia, and is in general about 40 feet above the level of the rivers, and there are some moderate elevations. The city is regularly laid out in streets running N. and S., crossed by others running E. and W., and there are also broad avenues which traverse the rectangular divisions diagonally. Five of the avenues radiate from the Capitol, and five others from the President's house. Only a small part of the ground-plan has yet been built upon, the streets consisting for the most part of clumps of buildings here and there, and of unconnected houses.

The following are the principal public buildings:—The Capitol occupies an elevated site about the centre of the ground-plan. The building is of freestone, covers an area of more than an acre and a half, and consists of a centre surmounted by a lofty dome, and two wings each surmounted by a smaller dome. A portico composed of 22 Corinthian columns of Potomac marble forms the entrance on the east, and a similar portico of 10 columns on the west. The entire length is 352 feet, the depth of the wings is 121 feet, and the height of the central dome is 120 feet. Beneath the dome is the Rotunda, a circular room 95 feet in diameter, and 95 feet high. It contains a colossal statue of Washington, and is ornamented with sculptures in relief and paintings. Within the Capitol are also included the Senate Chamber, the Hall of the House of Representatives, the Library Room of Congress, and the Chamber of the Supreme Court of the United States. The grounds round the Capitol (22 acres) are laid out in walks, and ornamented with shrubs and trees. The President's House, 1½ mile N.W. from the Capitol, is a handsome edifice of freestone, two stories high, with a lofty basement, and has an Ionic portico of 4 columns in front and 3 columns in depth. Near the President's House are the Treasury Office, the Army and Navy Offices, the General Post-Office, and the Patent Office. There are also in the city a City Hall, an Arsenal, a Theatre, a Hospital, a Penitentiary, and 21 places of worship. The Columbian College, in 1850, had 55 students and 10 instructors. There is also a Medical College.

The Navy Yard, on the Anacostia, comprises 27 acres. Several ships of war of the largest class have been built in this yard. The manufactures, trade, and commerce of Washington are as yet inconsiderable.

WASHINGTON, GEORGE, was born in Virginia, Feb. 22, 1732. On the death of his father in 1743, the family property was divided among his children: to George were left the lands and mansion occupied by his father at his decease.

George Washington was educated at a common school, which he left before he had completed his 16th year. The last two years of his attendance had been devoted to the study of geometry, trigonometry, and surveying. He never commenced the study of the classical languages, and he appears not to have had time even to learn French. When a boy his principal attention was given to surveying, in which he distinguished himself so much that when he had scarcely completed his 16th year he received a commission as public surveyor.

The next three years were devoted without intermission, except in the winter months, to his profession. A considerable portion of those three years was spent among the Alleghany Mountains. At the time he attained his 19th year the frontiers of Virginia were threatened with Indian depredations and French encroachments. To meet this danger the province was divided into military districts, to each of which an adjutant-general with the rank of major was appointed. George Washington was commissioned to one of these districts, with a salary of 150*l.* per annum. He now studied military exercises and tactics, and entered with alacrity and zeal into the duties of his office. These pursuits were varied by a voyage to Barbados, and a residence of some months there. After his return to his regular duties the number of military divisions was reduced to four, the northern division being allotted to Washington.

In 1753, when the French began to make aggressions upon the British territory in Canada, Washington was sent by Dinwiddie, the governor of Virginia, as a commissioner to confer with them, and learn their intentions. In March, 1754, the military establishment of the colony was increased to six companies. Colonel Fry, an Englishman, was placed at the head of them, and Washington was appointed second in command. The chief command however virtually devolved upon him on the death of Colonel Fry not long afterwards.

In the autumn of 1755 he was appointed to reorganise the troops of Virginia. He retained the command of them till 1758, when he resigned his commission, and retired into private life.

On Jan. 6, 1759, Washington married Mrs. Martha Custis, of Virginia, a young widow, with two children. Mr. Custis had left valuable estates, and a large sum in money. One-third of this property she held in her own right, the other two-thirds being equally divided between her two children. Washington had a considerable fortune of his own at the time of his marriage—the estate at Mount Vernon, on the Potomac, and large tracts of excellent land, which he had selected during his surveying expeditions, and obtained grants of at different times. He now devoted himself chiefly to the management of this extensive property. He had been elected a member of the House of Burgesses before he resigned his commission; and though there were commonly two and sometimes three sessions in every year, he

was punctual in his attendance from the beginning to the end of each.

On March 4, 1773, Lord Dunmore prorogued the House of Burgesses of Virginia. Washington had expressed his disapprobation of the stamp-act in unqualified terms. The non-importation agreement, drawn up by George Mason, of Virginia, in 1769, was presented to the members of the dissolved House of Burgesses by Washington. In 1773 he supported the resolutions instituting a committee of correspondence, and recommending the legislatures of the other colonies to do the same. He represented Fairfax county in the Convention which met at Williamsburg, in Aug., 1774, and was appointed by it one of the six Virginian delegates to the first general Congress. On his return from Congress he was virtually placed in command of the Virginia Independent Companies. In the spring of 1775 he devised a plan for the more complete military organisation of Virginia; and on June 15 of that year he was elected commander-in-chief of the army by Congress. A few days after his appointment he left Philadelphia to join the army at Cambridge, in Massachusetts. He reached it on the 2nd of July. The army, including sick and wounded, amounted to about 17,000 men, collected on the spur of the moment, and occupying a range of posts almost under the guns of the enemy. There were few stores, no military chest, and no general organisation. He immediately applied himself to the work of organisation, and kept up a correspondence with Congress, which by degrees adopted his suggestions.

The army was at first distributed into three grand divisions of two brigades each, the left division being at Winter Hill, the right at Roxburgh, and the centre at Cambridge, where Washington had his head-quarters. These positions were maintained with little alteration till Jan., 1776. During that interval the American regular army sunk to 9650 men, to whom were added 15,000 militia, who were to remain only till the middle of January. During this time Washington detached 1100 men, under Arnold, in the direction of Canada, and equipped and sent out armed vessels from the New England ports. Occasional cannonades and skirmishes took place at the advanced posts; but no decisive blow could be hazarded; and the patience of the commander-in-chief was severely tried by the cabals of the officers, the undisciplined habits of the men, and the pragmatical conduct of the civil authorities.

Towards the end of Dec., 1775, General Howe, who had succeeded Gage in command of the British army, was fitting out part of the fleet in Boston harbour for some secret enterprise. General Lee was despatched to place New York in a state of defence, but the expedition proved to be destined against North Carolina. Washington became impatient to attack Boston, but was twice overruled by a council of war. At last, March 4, 1776, the Americans took possession of Dorchester Heights; and on the 17th the British evacuated Boston. As soon as the British fleet had put to sea Washington set out for New York; but he was obliged by the end of August to evacuate that city, cross the Hudson, and fall back behind the Delaware. Congress at last saw the necessity of raising a regular army of men enlisted for a longer period than a year, and of investing Washington with full powers. Thus strengthened, he remodelled his troops, recrossed the Delaware on the night of Dec. 25, and broke up and drove back the whole of the enemy's line of cantonments on that river. He then established his winter-quarters at Morristown in New Jersey.

The campaign of 1777 did not open till the middle of June, and was for some time nothing but a series of skirmishes. Washington however had received a supply of arms from France. At length the British landed on the banks of the Elk River, which flows into Chesapeake Bay. The Americans were defeated on the Brandywine, and again at Germantown in Pennsylvania, Oct. 4. The British took possession of Philadelphia after the battle. On Dec. 18 Washington began to construct a fortified encampment at Valley Forge. He was at this time harassed by cabals among the general officers. The winter was a trying one. Washington employed it in planning an entire remodelling of the troops, and in procuring for them more liberal rewards for length of service. The ratification of the treaty with France was celebrated in the camp with great solemnity May 6, 1778. The British in Philadelphia, though only twenty miles distant from the American camp, allowed the winter and spring to pass without making any attempt to assault it. These concurring circumstances enabled Washington to bring his troops into the field in 1778 in tolerable spirits. Howe evacuated Philadelphia, June 18, and Washington crossed the Delaware with his whole army. He attacked the enemy at Monmouth on the 28th. Night put an end to the attack, and under its cover the British continued their retreat. Washington advanced to the Hudson, and crossing it at King's Ferry, encamped near White Plains. Count d'Estaing, with a French fleet of twelve ships of the line and four frigates, arrived about the same time off Sandy Hook. The American army was engaged for four months in arrangements for the defence of New England, during which interval the English laid New Jersey waste. Washington in December retired into winter-quarters.

During the whole of 1779 Washington retained his position in the high lands of the Hudson and remained on the defensive. Rochambeau with a French armament, arrived at Newport Rhode Island, July 10, 1780. A plan of combined operations against the British in New York was concerted by Washington and the French commanders. The naval superiority of the English however prevented anything being done, and the year wore away unmarked by any incidents except the treason of Arnold and the execution of Major André.

The year 1781 opened with a mutiny among the Pennsylvania and Jersey troops, which was subdued by the promptitude and self-possession of Washington. He was now strengthened not only by a French auxiliary army, but by liberal supplies from France. The main source of his weakness was the want of support from the genera

government. On July 4 he encamped near Dobb's Ferry, on the Hudson, and was joined on the 6th by the French army under Count Rochambeau. Having decided to relinquish the siege of New York, he reached Lafayette's head-quarters at Williamsburg in Virginia, Sept. 14. De Grasse, who commanded the French fleet, had previously entered the Chesapeake and landed 3000 men from the West Indies, who united with Lafayette. Cornwallis took possession of York Town and Gloucester on the opposite side of York River in Virginia. The American and French generals advanced from Williamsburg and completely invested York Town Sept. 30. Cornwallis proposed a cessation of hostilities Oct. 17, and signed articles of capitulation. The French army remained in Virginia, its head-quarters being at Williamsburg; the American forces were marched into winter-cantonments in New Jersey and on the Hudson.

In the following year Washington made every possible exertion to expel the British from New York and Charleston. Meantime negociations for peace with Great Britain were going on, whilst great discontent prevailed in the American army on account of the ill-treatment it had experienced from Congress. Having pacified the officers, Washington became their advocate with Congress, and obtained the concession of their demands. At length, on Nov. 25, 1783, peace was proclaimed, and the British evacuated New York. On Dec. 4 Washington took a solemn farewell of the officers of the army, and on Dec. 23 he resigned his commission to Congress.

In 1787 the legislature of Virginia elected Washington their delegate to the Convention which met at Philadelphia. The Convention unanimously chose him for their president, and he assisted in framing the American constitution. On the 30th of April, 1789, he took the oath of office as the first President of the United States. Jefferson was appointed secretary of state; Hamilton, secretary of the treasury; and Knox, secretary of war. Randolph had the post of attorney-general. The appointments to the supreme court cost him much anxious scrutiny. Jay was made chief-justice. After making these appointments he undertook a tour through the eastern states, and returned to be present at the opening of Congress, in January, 1790.

The session of 1791 produced the laws for apportioning the representatives, establishing a uniform militia system, and increasing the army. It now became apparent that two great parties were in the process of formation. Jefferson was the head of the democratic party, Hamilton of what was afterwards called the Federalist party. Washington, though leaning himself towards the Federalist party, endeavoured to reconcile these ardent spirits. Meantime, his own term of office drawing to a close, he yielded to the solicitations of all parties, and consented to be re-elected. He took the new oaths, March 4, 1793.

The first question that came before the cabinet after the re-election rendered more decided the differences which already existed. The European parties, of which the court of St. James's and the French Republic were the representatives, were eager to draw the United States into the vortex of their struggle. The president and his cabinet were unanimous in their determination to preserve peace; and they succeeded. The proclamation of neutrality was published April 22, 1793.

This wise act was bitterly assailed by the partisans of France. Washington avowed his disapproval of the violent proceedings of the Jacobins in France, and his wish for a peaceable settlement of the differences with Great Britain; and notwithstanding the opposition of the democratic party, Mr. Jay was sent on a mission to London, and the treaty negociated by him was ratified Aug. 8, 1795.

Washington was succeeded as President of the United States by John Adams, March 4, 1797. Except when summoned in May, 1798, to take the command of the provincial army on the prospect of a war with France, he did not again engage in public business. Washington died Dec. 14, 1799, and was buried at Mount Vernon.

WASP, the name familiarly applied in English to insects of the genus *Vespa*, of which there are several native species. The Hornet, *Vespa Crabro*, is the largest, and in Britain occurs only in the southern counties, building its nest in trees, and working night and day. It passes the winter in deep holes, which it excavates in decayed trees towards the end of autumn. Of the other indigenous species, the *Vespa vulgaris* is the most common. It is a ground-wasp, as is also the *Vespa rufa*, a rarer species, making smaller nests and associated in less populous societies. Of tree-wasps we have *Vespa holsatica* of Linnæus, which is the *Vespa Anglica* of Leach. A new British species has been described under the name of *Vespa borealis*, by Mr. Frederick Smith, in an interesting paper on British wasps, in the 'Zoologist' for June, 1843. It lives in fir-woods in Yorkshire and in the north of Scotland.

Wasps live in societies composed of females, males, and neuters or workers, which are essentially females, but have the reproductive organs undeveloped or passive. The females are usually largest, but of them there are two sizes—one very much larger than the neuters, and laying eggs which produce two sexes, while the other is about the same size, and lays only male eggs. The larger kind are produced later than the workers, and come forth to be queens and to found new colonies in the following spring. Destined to become the monarch of a populous state, the queen-mother is at first an outcast and alone. Industry effects her greatness. With instinctive ambition, ere her subjects are born, she lays the foundations of the metropolis of her kingdom, building the first houses herself. She then gives birth to their first inhabitants, whom she feeds and nurses without assistance. 'At length,' to quote the animated description of Kirby and Spence, 'she receives the reward of her perseverance and labour, and from being a solitary unconnected individual, in the autumn is enabled to rival the queen of the hive in the number of her children and subjects, and in the edifice which they inhabit—the number of cells in a vespiary sometimes amounting to more than 16,000, almost all of which contain

either an egg, a grub, or a pupa, and each cell serving for three generations in a year; which, after making every allowance for failures and casualties, will give a population of at least 80,000. Even at this time, when she has so numerous an army of coadjutors, the industry of this creature does not cease, but she continues to set an example of diligence to the rest of the community. If by any accident, before the other females are hatched, the queen-mother perishes, the neuters cease their labours, lose their instincts, and die.'

The community of wasps and its nest are called a vespiary. There are several hundred females in a large vespiary, few of which survive the winter. The survivors fly about in spring actively engaged in preparations for their future colonies. Once established, they never quit the nest. In their youth they emerge from the pupa towards the end of August, and at the same time with the males. They pair in September and October. The males are about equal in number with the females. Their habits are industrious, and not, like those of drones, luxurious and lazy. They are the street-sweepers and undertakers of their city. They carry off the rubbish and the bodies of the dead, which, if too heavy for their strength, they quarter and carry away piecemeal. Their lives are peaceful, and they die a natural death at the close of the year, when the cold destroys both them and the workers.

The neuters are the most numerous and busiest class of the vespine community. They are the architects, soldiers, and commissaries of the state. They build the nest, gather provisions, regulate the nurseries, and revenge insults. They ramble everywhere with impunity, and all provisions are to their taste. They levy contributions wherever they can, and fight for their spoil if disturbed. Robbers and ferocious enemies of the rest of the world, they are faithful servants of the commonwealth of which they are members. The food they collect is shared among all with impartial justice. The worker having brought home his spoil, perches on the top of the nest amid his assembled compatriots, and disgorging the sweets he has collected, fairly distributes them. When not occupied on foraging expeditions, the neuters are employed in the enlargement and repair of the nest. Celerity and order prevail in all their operations. Each of the masons has his allotted space, an inch or an inch and a half in extent, wherein he conducts his plastering operations, his mouth serving as a hod, carrying a ball of ligneous fibre, previously torn by his powerful jaws from gateposts, wood-blocks, and neighbouring trees. This fibre, kneaded together and moistened with saliva, is made into a paper, of which are constructed the combs, each made up of a number of hexagonal cells opening downwards. The outside of the whole nest is coated with foliaceous layers. The cells of the comb of the common English wasp are brown, and coarse in texture; but where the larvæ have spun their cocoons, they are lined with a white and semi-transparent paper, fashioned on the mould of the cell, and probably made by the larvæ themselves.

Wasps are fond of honey, but obtain it by plundering the bee-hives, which, being the more powerful insects, they are enabled to do by main force. The bees, suffering from the cold in the mornings and evenings of the latter end of the season, retire into the snugger and warmer recesses of the hive among the honeycomb, when the wasps, not so delicate in constitution, take advantage of the unguarded entrances of the hive and enter to levy contributions. Running up the inside, they make for the honey, and carry away all they can. Hornets, still more impatient, attack the bees when laden with their treasures in going homewards, and carry them off prisoners, to whom no quarter is shown. Both wasps and hornets display great sagacity when the body of the captive is too heavy for their strength, by cutting off the head and limbs to lighten the weight.

For full accounts of the habits of these interesting insects, consult the writings of Réaumur, and Kirby and Spence's 'Introduction to Entomology.' [Vespidæ.]

WASSELONNE. [Rhin, Bas.]

WASTE. The notion of waste seems to be when a tenant for years, by the courtesy, by dower, or for life, so deals with land, or such things as are attached to the soil, as to destroy them or greatly damage them. Accordingly the old action of waste lay against such tenants by him who had the immediate estate of inheritance. Waste is either *voluntary*, which is an act of commission, or *permissive*, which is a matter of omission only.

Voluntary Waste chiefly consists in felling timber trees, pulling down houses, or permanently altering any part of a house, in opening new mines or quarries, in changing the course of husbandry, and in the destruction of heir-looms.

Permissive Waste consists chiefly in allowing the buildings upon an estate to go to decay.

Tenants in tail, as they have estates of inheritance, may commit every kind of waste; the meaning of which is, that they can do those acts to the land which tenants who have not an estate of inheritance cannot do. Tenants in tail after possibility of issue extinct are not impeachable for waste, but like tenants for life when their estates are given without impeachment of waste, they may be restrained from wilfully destroying the estate. Copyholders cannot, unless there be a special custom to warrant it, commit any kind of waste, and every species of waste not warranted by the custom of the manor operates as a forfeiture of the copyhold.

The writ of waste, originally given by the stat. of Marlbridge, 52 Henry III., c. 24, was abolished by the 3 & 4 Wm. IV., c. 27, s. 36. By the 3 & 4 Wm. IV. c. 52, s. 2, remedies by action of trespass or trespass on the case are given against the executors of any deceased person for any wrong committed by him in his lifetime against the real or personal property of another within six months of his death, provided the action be brought within six months after the personal representatives have taken upon themselves the administration of the estate.

The most complete remedy in cases of waste is

by application by bill to the Court of Chancery, which will not only direct an account to be taken and satisfaction to be made for the damage done, but will interpose by way of injunction to restrain the commission of future waste.

It has long been usual when estates for life are expressly limited, to insert a clause declaring that the tenant shall hold the lands 'without impeachment of waste.' These words enable him to cut down timber and to convert it to his own use; but he may be restrained in equity from committing malicious waste so as to destroy the estate, or cutting down timber which serves for shelter or ornament to a mansion-house, or timber unfit to be felled. This is what is called the doctrine of Equitable Waste.

Ecclesiastical persons, who hold lands in right of a church, are disabled from committing waste, though, like other tenants for life, they have the right to take from the land materials for necessary repairs. The Court of Chancery can grant an injunction against any ecclesiastical person to stay waste in cutting down timber, pulling down houses, or opening quarries or mines on the glebe.

WATCH. [Horology.]

WATCHET. [Somersetshire.]

WATER, in its liquid, aëriform, or solid state, is universally diffused through nature. It was once considered as one of the four elements, and is in common language still frequently so termed. Water however is now known to be a compound substance consisting of hydrogen and oxygen, in the proportion of two volumes of hydrogen and one volume of oxygen; or by weight it is composed of 1 equivalent of hydrogen, 1, + 1 equivalent of oxygen, 8, = 9, its equivalent: it is in fact a protoxide of hydrogen.

Water is colourless, transparent, inodorous, and insipid; it is an imperfect conductor of heat and electricity; it is very slightly compressible, yielding only about 46.65 millionths of its bulk to the pressure of the atmosphere. Its specific gravity is 1, being the unit to which the density of all liquids and solids is referred, as a convenient standard, on account of the facility with which it is obtained in a pure state. Like all other fluids and substances it expands by exposure to an increase of temperature, and with a curious exception, the dilatation within certain limits is proportionate to the degree of heat to which it is subjected. It is however found that water a few degrees above its freezing point is more dense than exactly at it: for example, if water at 40°, which is the point of its greatest density, be cooled, it expands as it cools till reduced to 32°, when it solidifies, and this constitutes the exception to the law of contraction by reduction of temperature. The force with which water assumes the solid state is so great, that iron vessels of considerable thickness have been burst by it.

When water is heated to a certain point, which is arbitrarily fixed on the scale of Fahrenheit's thermometer at 212°, it acquires the greatest volume it is capable of assuming; it then boils, and is converted into vapour. A little before ebullition commences a slight noise is heard, which is commonly called simmering; this arises from the formation of small bubbles of vapour or steam at the bottom of the vessel, which ascend, on account of their lightness, into the upper and colder portion of the water; in this they are condensed, and the noise results from the sudden condensation of the bubbles of vapour.

Steam at 212° occupies about 1700 times as much space as the water does from which it is generated. It is upon the elastic force of steam communicated by heat, and the instantaneous annihilation of it by cold, that the working of the steam-engine depends.

WATER. Water is commonly divided into certain kinds, according to the source whence it is obtained, viz. into atmospheric water including rain and dew; and into terrestrial water, comprising spring, river, well, lake, marsh, and sea water, and, lastly, mineral waters. Water is seldom found in a state of perfect purity, but, from its great solvent and absorbent power, it is impregnated with a variety of saline substances, gases, and animal and vegetable substances, either living or undergoing a process of decomposition. The effect of these is to communicate different properties, and generally give it a peculiar taste, and not unfrequently an odour, which, if not cognisable by the blunted senses of man, is so by animals, especially the camel, which can scent water at a great distance in the desert. The specific gravity is often much increased, especially that of sea-water and of mineral waters, from the saline ingredients, and of some of the great rivers, from the quantity of mud and other matters which they contain.

Rain-water is commonly reckoned the purest; but it is by no means so free from accidental impregnations as is generally supposed. Whatever foreign ingredients exist in the atmosphere of any place are brought to the ground by the first rain that falls. Rain-water, from its great purity, has high solvent powers, which fit it well for the part it has to perform in the economy of nature, and also for many operations in the laboratory. In this respect it is nearly equal to distilled water. The surface water of sandy districts is the purest that can be obtained naturally.

Dew differs little from rain, save in containing more atmospheric air. [Dew.] Ice-water differs, when first obtained, from rain, in being destitute of atmospheric air, and hence it cannot sustain respiration in fishes; it is for the same reason mawkish and insipid; but by exposure to the air it speedily absorbs a due proportion. Snow-water is nearly similar.

Spring-water is of various degrees of purity, according to its source and the strata through which it passes. Its most common source is rain, which percolates through some of the superficial strata, and, meeting with some obstacle, is forced up to the surface.

River-water mostly originates in springs, augmented by rain-water. If it flows over sand or granite, it is found very pure, depositing in its course many earthy salts, especially the calcareous ones, from the escape of carbonic acid. This circumstance renders the water vapid, and less pleasant to drink than spring-water. It possesses

however the property of absorbing much oxygen; hence the surface-water both of rivers and the ocean holds more oxygen than the atmospheric air, to the amount even of 29.1 per cent. This contributes both to the maintenance of the respiration of fishes, and these, in their turn, to the growth of aquatic plants. The abundant supply of water furnished by large rivers offers a great temptation to procure thence the immense quantity required for the use of the inhabitants of towns on their banks. This may or may not be a wise proceeding, according to the nature of the water. If hard, it can only be rendered fit for domestic purposes, such as cooking and washing by chemical processes, or by long boiling in appropriate boilers. When, in addition to its saline impregnations, numerous adventitious ones, many of a disgusting nature, are found, it is clear that such water is very unfit for the use of man. This is unhappily the case with some of the water furnished to the inhabitants of London.

Well-water is generally obtained from a greater depth than spring-water. It is also generally hard, or is apt to become so if kept in a reservoir lined with bricks, unless they be coated with an insoluble cement. The water from old wells is more pure than from recent ones, the soluble particles being all gradually washed away. The pump and well waters in and about London, and chalky districts in general, are mostly hard.

Lake-water varies much in its composition. The main difference depends on the lake possessing an outlet or being destitute of one. The water of the former generally corresponds with that of the rivers which flow into it; but the flow becoming slower, there is more scope for the development of animal and vegetable matters, and for the decomposition of organic remains.

Marsh-water is stagnant, and abounds in animal and vegetable remains, either in a state of decomposition or passing into new combinations, generally of a low grade, as the lowest members of the vegetable kingdom and those of each section of the animal are mostly aquatic. These waters are for the most part unwholesome, both from the gases they emit and also when used as drink.

Impure or putrid water may be rendered pure by adding alum or recently-prepared charcoal, or by simply pouring it from one vessel into another in the sun.

Water of the ocean abounds in saline matters so much, that it is unfit for use internally, except in small quantity as a medicine. Sea-water may be rendered fit for drinking by pressure, filtration, and freezing, or simply by boiling it, and condensing the steam as it arises.

For many chemical, pharmaceutical, and even dietetical purposes, water must be of greater purity than it is generally found. For this end it is directed to be distilled, in which process never more than two-thirds of the water put into the still should be allowed to pass over.

Mineral Waters are generally characterised by possessing some principle different from what is found in common water, or some of the ordinary principles in unusual proportion; yet among these are reckoned certain springs which have no claim to repute beyond what is due to their extreme purity, such as Malvern and Holywell, or to having a higher temperature throughout the year than the mean of the latitude where they are situated. These last are classed among the *thermal* springs, which are properly divided into two sections, the *mineralised hot* springs and the *unmineralised*, among which are some only tepid, such as Matlock, where some springs are 66°, the lowest of the class in Britain, and others cold, presenting this peculiarity, that the tepid springs arise from fifteen to thirty yards above the level of the river Derwent, whilst those which arise either above or below this range are cold.

For practical purposes mineral-waters may be classed under four heads, each susceptible of secondary heads, according as they are hot or cold, or have other peculiarities, viz.: saline, alkaline, chalybeate, and sulphureous. It will not be possible to mention more than a few of the most important of each.

Saline aperient springs. Of these some are hot, others cold. The chief are—Carlsbad, Marienbad, Egra, Kissingen, Wiesbaden, Baden-Baden, Seidlitz, and Saidschutz, with Pullna, in Germany; Cheltenham, Leamington, and Harrowgate in England.

Alkaline waters, owing their properties to different saline principles, are found at Carlsbad, Marienbad, Kissingen, Pullna, Saidschutz, Ems, Töplitz, and Wiesbaden, in Germany; Harrowgate, Scarborough, and other Yorkshire springs, Cheltenham, Leamington, Bath, and elsewhere in England.

Chalybeate waters. With these acidulous waters are often reckoned, as the iron is often associated with much free carbonic acid gas. Some of the chief are Spa, Pyrmont, Schwalbach, Marienbad, Aix-la-Chapelle, and Seltzer in Germany; Tunbridge, Harrowgate, and Brighton, in England.

Sulphureous waters. Aix-la-Chapelle, in Rhine Prussia, Bareges, and other Pyrenean springs, are hot; Harrowgate, Askern, and others in Yorkshire, cold.

Ioduretted and other waters. Many springs have of late been found to contain a notable quantity of iodine or bromine, others contain both. Creuznach, in Germany, contains both, but most iodine; Llandrindod and Builth in South Wales, the springs issuing from the lias at Leamington, Gloucester, Tewksbury, and Cheltenham, contain iodine. Bromine, but not iodine, exists in small quantity, in the saline aperient waters near London, such as Epsom, also in the springs from the coal-formation of Ashby-de-la-Zouch, Newcastle-on-Tyne, and Kingswood, and Bonnington near Edinburgh: Woodhall, near Ashby-de-la-Zouch, contains most iodine of any British spring yet investigated.

WATER AND WATERCOURSES. The right of conducting water through one piece of land for the use of another is an incorporeal hereditament of the class of Easements, and was known in the Roman law by the name of the *servitus aquæ ductus*. The right of taking water out of the well or pond belonging to another person is an incorporeal hereditament of the class

profits called in the Roman law the *servitus aquæ haustus*. These rights, in our law, must be either derived from a grant or established by prescription.

The legal presumption is that the proprietor of each bank of a stream is the proprietor of one-half of the land covered by the stream; but every proprietor has a right to use the water which flows in the stream. No proprietor can either diminish the quantity of water which would otherwise descend upon the proprietors below, nor throw back the water upon the proprietors above, so as to overflow or injure their lands.

The only modes in which a right to the use of running water, in a manner inconsistent with the common law rights of others can be established, are either proof of an actual grant or licence from the persons whose rights are affected, or proof of an uninterrupted enjoyment of such a privilege for such a period as the law considers sufficient to constitute a right by prescription. The period of twenty years has been generally fixed upon by the courts of law and equity for this purpose, and the same period has been adopted in the Prescription Act (2 & 3 Wm. IV., c. 71, s. 2). The exclusive right to a flow of water once acquired can only pass by grant as an incorporeal hereditament.

WATER-CRESS. [Sysymbrium.]

WATER-HEMLOCK. [Cicuta Virosa.]

WATER-HEN. [Rallidæ.]

WATER-LILY, the common name of several plants remarkable for their beauty, belonging to different genera of the natural order *Nymphæaceæ*. All the species of the genera *Nymphæa* and *Nuphar* are called Water-Lilies. *N. cærulea*, Blue Water-Lily, is a native of Lower Egypt in rice-grounds and canals about Rosetta, Damietta, and Cairo. *N. edulis*, the Eatable Water-Lily, is a native of the East Indies, in wet fenny districts. Its flowers are small, and white or reddish. Like all the species, it has large pear-shaped roots, which contain an abundance of starch, and they are consequently used as articles of diet. *N. pubescens* is a native of the East Indies, Malabar, Moluccas, Tranquebar, Ceylon, Java, and has been also found at Waree and Acra on the western coast of Africa. This plant is called *Lotos* throughout India, and is held sacred by the Hindoos. Its flowers are of a beautiful white. They expand during the day and close at night, and exhale a strong odour. *N. Lotus*, the Egyptian Lotos, is a native of Egypt, and grows in slow-running streams, especially in the Nile near Rosetta and Damietta, and is found in rice-fields during the time they are under water. It has large white flowers with the sepals red at the margins. The roots are large, tuberous, and eatable. This plant is regarded with superstitious veneration by the Egyptians. *N. alba*, the common White Water-Lily, is a native of ditches, ponds, and lakes throughout Europe, and is abundant in Great Britain. *N. odorata*, Sweet-Scented Water-Lily, is a native of North America from Canada to the Carolinas; it is found in deep ditches and slow-running rivers.

One of the most beautiful productions of the vegetable kingdom is closely allied to the genus *Nymphæa*, and has been called by Lindley, in honour of the Queen of Great Britain, *Victoria regia*. This splendid plant, in the dimensions of its leaves, the colour, size, and fragrance of its flowers, may deservedly be called the Queen of Flowers. It is a native of Guiana. It is now to be seen in a high state of perfection in the Royal Gardens at Kew, at Chatsworth, and at Sion House.

WATER-MELON. [Cucumis.]

WATER-OUZEL. The water-ouzels haunt the banks of clear streams, rejoicing in the vicinity of some tumbling cascade, hurrying over a rocky declivity. They plunge into the water in quest of their food, which consists of insects and small shelled mollusks.

Three species are European, and one American, viz. the *Cinclus Mexicanus* of Swainson.

The Common Water-Ouzel of our islands (*Cinclus aquaticus*) is the *Merlo Aquatico* of the Italians; *Merle d'Eau* of the French; *Wasser-Amsel* of the Germans; and *Water-Crow*, *Water-Piet*, *Dipper*, and *Bessy-Ducker* of the British.

Geographical Distribution.—Sweden, Scandinavia, Siberia, Russia, Germany, the Alps, the Pyrenees, Holland (rare), Spain, Italy, England, Scotland, Wales, and Ireland.

Habits, Food, &c.—'As far as the fact of its submersion goes,' says Mr. Gould, 'we have ourselves many times witnessed it; but have never been able to mark unobserved the actions of the bird under water, so as to say whether it is by a powerful effort that it keeps itself submersed, or whether it is completely at its ease as some have asserted. The Water-Ouzel is a spirited and restless little bird, full of life and activity, flitting from stone to stone along the borders of the streams; and it is especially fond of perching upon any rock that happens to be elevated in the centre of the current, where, conspicuous by its white breast, it may be observed dipping its head and jerking its tail in a manner not unlike that of the wren, at one moment pouring forth a lively twittering song (and that even in the depth of winter, when the earth is covered with snow), and at the next diving down, and rising again at a considerable distance. When so disposed, its flight is straight, low, and rapid; in fact, much like the Kingfisher; and it is equally solitary in its habits. It is however seldom seen in the same situations as the Kingfisher, the latter being a frequenter of streams which flow through a fertile country, while the Water-Ouzel is peculiar to the rapid and limpid streams which descend the mountain sides and run through glens at their base.' ('Birds of Europe.')

The food of this species consists of land and water insects and their larvæ, *Ephemeræ*, *Phryganeæ*, &c., and fresh-water testaceous mollusks. Mr. Macgillivray found in their stomachs beetles, and the animals of *Lymnææ* and *Anclyi*. The Scotch persecute it under the impression that it feeds on the spawn of the salmon. The justice of this persecution has been doubted.

Fissures of rocks, crags, and rough stones are selected as the locality for the curious nest, which is domed, and similar, with regard to materials, to those which compose the nest of the wren.

WATER-PLANTS are those plants which live entirely in water, or which require a preponderating quantity of water as the medium of their existence. The families of plants, like the families of animals that live in the water, are found to belong to all classes into which the whole have been divided, although those belonging to the lower classes are by far the most prevalent. Many of the families of plants having the highest organisation have members belonging to them which are inhabitants of the water. Of this the *Ranunculus aquatilis* is an example, in the natural order *Ranunculaceæ*. All the species of the orders *Nymphæaceæ*, *Callitrichaceæ*, *Ceratophyllaceæ*, and *Podostemaceæ*, belonging to the class Exogens, grow in water. Among Endogens, the orders *Butomaceæ*, *Naiadaceæ* or *Fluviales*, *Pistiaceæ*, *Alismaceæ*, &c., consist entirely of water-plants; whilst one of the largest of the few families into which cryptogamic plants are divided, the *Algæ*, consists almost entirely of plants which live in the water. [Sea-Weeds.]

WATERFORD, a county in the province of Munster, in Ireland, is bounded S. by St. George's Channel, E. by the æstuary called Waterford Harbour, N. by Tipperary, and W. by Cork. The greatest length E. to W. is 50 miles; the greatest breadth N. to S. is 30 miles. The area is 721 square miles. The population in 1841 was 196,187.

Surface and Geology.—The coast-line is bounded W. by Youghal Harbour, E. by Waterford Harbour, and intermediate are Tramore Bay and Dungarvan Harbour. The general character of the county is mountainous. The great mountain-tract which extends from Waterford on the east coast to Dingle Bay on the west, comprehends the whole of the county of Waterford: it is interrupted on a line from Dungarvan to the valley of the Suir, west of Clonmel, by the southern extremity of the great plain which occupies the central part of Ireland. The Cummeragh Mountains, which occupy the part of the county west of Dungarvan, are among the highest and wildest in Ireland: the height of Monavallagh is 2598 feet above the sea. The Waterford mountains contain two varieties of slate: the old transition slate, coloured gray, which is extensively used for roofing, and the newer slate, which rests on the older; the lower portions of its strata consist of alternating beds of brownish-red quartzose conglomerate and coarse red slate. The valleys are occupied by limestone, and there is a clay-slate district, which contains several copper and lead mines, some of which are worked. Iron-ore is also found.

Rivers.—The Suir, which rises in Tipperary, after being joined by the Nier, from the Cummeragh Mountains, forms the boundary-line between Waterford and Tipperary and Kilkenny. The united waters of the Suir and Barrow form the æstuary called Waterford Harbour The Suir is navigable for large vessels up to Waterford city, and to Carrick-on-Suir for those of which the draught does not exceed 11 feet. The Blackwater, which rises in the Kerry Mountains, enters the county on the west, and runs due east to Cappoquin, where it turns southward, and discharges itself into Youghal Harbour, after receiving midway the river Bride. The Blackwater is navigable for vessels of a hundred tons to its confluence with the Bride, and for vessels of seventy tons as far as Cappoquin.

Agriculture.—Of the entire area of the county (461,553 acres) 325,345 acres are arable, 105,496 uncultivated, 23,408 in plantations, and the rest covered by water or occupied by towns. In 1841 there were 3190 farms of 1 acre to 5 acres, 3024 of 5 to 15 acres, 2179 of 15 to 30 acres, and 2336 of upwards of 30 acres. The common course of tillage is potatoes, wheat, oats, and again potatoes, but some of the better farmers grow only one corn crop in the course. The common Irish cow is the general dairy stock; but some of the best English breeds have been introduced by gentlemen and large farmers. Most of the sheep are of a large and coarse breed.

Divisions and Towns.—The county of Waterford is divided into 7 baronies. It is in the united bishopric of Cashel, Emly, Waterford, and Lismore. It is in the Leinster Circuit, and the assizes are held at Waterford. It sends in all 5 members to parliament, 2 for the county, 2 for the city of Waterford, and 1 for the borough of Dungarvan.

The following are the principal towns, with the population of each in 1841:—

Cappoquin, 9 miles N.W. from Dungarvan, stands on the E. bank of the Blackwater. It is prettily situated, and consists chiefly of one street. Population, 2341.

Carrick-on-Suir. [Tipperary.]

Carrickbeg is a suburb of Carrick-on-Suir, with which it is connected by a good stone bridge. Population, 2680.

Clonmel. [Clonmel.]

Dungarvan, a post-town and parliamentary borough, 25 miles S.W. from Waterford, is situated on both sides of the æstuary of the small river Colligan, at its entrance into the bay called Dungarvan Harbour. A good stone bridge of one arch connects the two portions of the town. The streets are mostly narrow. There is a market-house, a church, and 4 Roman Catholic chapels, a convent, sessions-house, and an ancient castle used as a barracks. Vessels of not more than 150 tons can discharge at the quay. The parliamentary borough returns one member. Population, 8625.

Kilmacthomas, 14 miles W.S.W. from Waterford, stands on the small river Mahon. Population, 1491.

Lismore, 15 miles W.N.W. from Dungarvan, is situated on the S. bank of the Blackwater, 3 miles from the point where that river changes its course from E. to S. near Cappoquin. The Blackwater, opposite Lismore, is joined by the Owenshad, a rapid stream. A handsome bridge, the centre arch of which has a span of 100 feet, crosses the main river a little above the point of junction, and leads to the town, which occupies the summit of the southern bank. At the eastern extremity of the town is the cathedral, a plain handsome building, with a tower and spire.

is in the later English style, and was chiefly built by the Earl of Cork in 1663. The castle, a magnificent pile, originally erected by King John in 1185, and greatly enlarged and strengthened by the first Earl of Cork, stands on the summit of a rocky bank, which rises to the height of nearly 100 feet above the Blackwater. The diocese of Lismore is now included in the united diocese of Cashel, Emly, Waterford, and Lismore. Population of the town, 3007.

Passage, a village, on the east side of Waterford Harbour, intermediate between the entrance of the harbour and the city of Waterford, stands opposite to a roadstead where hundreds of large vessels may anchor in safety. Population, 624.

Portlaw, a post-town, 8 miles W. by N. from Waterford, is situated on a small affluent of the Suir, which affords excellent water-power, and drives the water-wheels of extensive cotton-factories. Population of the town, 3647.

Tallow, a post-town, 17 miles W. from Dungarvan, stands about half a mile distant from the S. bank of the Bride. It is a decayed-looking place, and contains a church and a Roman Catholic chapel. Population, 2969.

Tramore, a small bathing town, 6 miles S. from Waterford, stands on the W. side of Tramore Bay. It has a church and Roman Catholic chapel. Tramore Bay is dangerous.

History and Antiquities.—The Menapii, a Belgic colony, appear to have been the ancient inhabitants of Waterford and the adjoining county of Wexford. The Desii, from the county of Meath, were a powerful clan at the period of the English invasion, when their importance was nearly destroyed. In 1171 Henry II. granted the city of Waterford and the adjacent province to Richard Le Poer, his marshal, and by marriage the estates and honours of his descendants came to the Beresford family, who still retain large possessions in the county. The county suffered little during the rebellion in 1798. Waterford city has been the chief scene of most of the historical events of importance.

Many remains of antiquity are found in the county. At Ardmore is one of the round towers, and there are found in several parts of the county intrenchments, earthworks, barrows, and cromlechs. A large double trench, called by the Irish 'the trench of St. Patrick's cow,' may be traced for 17 or 18 miles across the Blackwater towards Ardmore. A second trench runs westward from Cappoquin into Cork. At one period there were twenty-four religious establishments existing in the county, and the ruins of some of them still remain at Mothill, Dungarvan, Stradbally, and Lismore. The ancient castles and fortified places were also numerous.

WATERFORD, a county of a city, city, municipal borough, parliamentary borough, and the capital of the county of Waterford, 97 miles S.S.W. from Dublin, in 52° 15′ N. lat., 7° 7′ W. long., is situated on the S. side of the Suir, and is connected with its suburb of Terrybank on the N. side of the river, by a bridge 832 feet long, which opens in one part to allow vessels to pass. The city is about a mile long. A noble quay extends 1200 yards along the bank of the river, from which the city rises gradually. The situation is very fine, but the greater part of the streets are dark, dirty, and mean-looking. Waterford is about 12 miles from the sea, and vessels of 800 tons burden can lie by the side of the quay, but larger ships anchor about six miles lower down, opposite the village of Passage. The principal public buildings are—the Roman Catholic Cathedral, an elegant modern structure; the bishop's palace, which is of hewn stone, with a double front; 2 parish churches; 5 Roman Catholic chapels; and 5 or 6 places of worship for dissenters. The other public buildings are—a court-house, an exchange, a custom-house, a theatre, an assembly-room, barracks, and a gaol. There are several charitable institutions.

The exports are chiefly to England, and almost wholly agricultural—bacon, pork, butter, grain, flour and meal, cattle, sheep, and pigs. The gross produce of the customs' duties in 1848 was 134,897*l*. The sailing vessels registered as belonging to the port in 1848 were 78 under 50 tons, and 123 of 50 tons and upwards; the aggregate burden was 23,244 tons; steamers, 14 (3187 tons).

The municipal borough is divided into 5 wards, and is governed by 10 aldermen, of whom one is mayor, and 30 councillors. The parliamentary borough returns 2 members. Population of the city, 23,216.

WATERING, in Horticulture, the process of applying water artificially to plants. Water in a greater or less quantity is necessary to the existence of the whole vegetable kingdom. Not only do the elements of water enter into the composition of the tissues of plants, but by its agency the various saline ingredients, as well as certain gases that enter into the composition of vegetable tissues, are carried into the plant. Water also exerts an influence on the temperature of the soil and of the plants to which it is applied. It is on these accounts that the application of water to plants is an important process in horticulture, more especially in the hothouse and greenhouse. [GREENHOUSE; HOTHOUSE.] During winter plants require little moisture, as the processes of life are at that period very inactive, but at the same time a small quantity is required in order to meet the demands of approaching activity. If plants are supplied with too much water during winter, their tissues become distended, and the whole plant is enfeebled. The largest supply of water is required when plants are growing rapidly and at the season when they are putting forth their leaves. When plants have ceased to grow, or when the leaves and flowers have ceased to expand, they require less water. When however the object in the culture of plants is to render either their leaves or fruits as succulent as possible, they should be supplied with abundance of water. This is done with spinach, lettuce, and other oleraceous plants, and by this means their tissues are rendered more tender, and their peculiar secretions, which are often disagreeable, are diluted. The same thing is done in the cultivation of the strawberry, where the object is to render the fruit as large as

possible. In this case however the large size of the fruit is always obtained at the expense of its flavour. Even plants bearing succulent fruits, as the melon, &c., may be over-watered, and the flavour of their fruit quite destroyed.

WATERLAND, DANIEL, D.D., was the son of the Rev. Henry Waterland, rector of Wasely or Walesly, in Lincolnshire, where he was born Feb. 14, 1683. He was admitted of Magdalen College, Cambridge, in March, 1699, obtained a scholarship in Dec. 1702, and was elected a fellow in Feb., 1704. Continuing to reside at the university, and having taken holy orders, he acted for many years as a tutor even after he had been presented by the Earl of Suffolk, in Feb., 1713, to the mastership of his college, and also to the rectory of Ellingham in Norfolk. In 1714 he took his degree of B.D. Soon after this he was appointed one of the chaplains in ordinary to the king (George I.), and in 1717 he received the degree of D.D., in which he was some time after incorporated at Oxford.

In 1720 Dr. Waterland preached the first course of sermons at the lecture founded by Lady Moyer, which he afterwards published. Next year he was presented to the rectory of St. Austin's and St. Faith's, in the city of London; and in 1723 he was promoted to the chancellorship of the church of York. The same year he published his 'Critical History of the Athanasian Creed.' In 1727 he was collated to a canonry of Windsor; and in 1730 he was presented to the vicarage of Twickenham; upon which he resigned his London living, but accepted the archdeaconry of Middlesex from his diocesan Bishop Gibson. Dr. Waterland was involved in frequent controversies with Dr. Clarke and the Arian party, Dr Sykes, and others, and he published a variety of tracts in maintenance of his opinions respecting the Divinity of Christ, the Trinity, &c. He died Dec. 23, 1740. Two volumes of his Sermons, with a discourse on the Doctrine of Justification, and another on Infant Communion, appeared in 1742, under the care of Joseph Clarke, M.A. and a complete edition of Archdeacon Waterland's works, with a Life of the author, by the late Bishop Van Mildert, was published at Oxford, in 11 vols. 8vo., in 1823.

WATERLOO. [Brabant, South.]

WATERLOO, ANTONI, was born near Utrecht about 1618. His landscapes are much prized, on account of their colouring, their skies, and their foliage. His etchings are also excellent: their subjects are taken chiefly from the vicinity of Utrecht, consisting of cottage scenes, crooked roads, woods, and entrances into forests, &c. He could not draw the figures: those in his pictures were painted by Weeninx and others. Though Waterloo was well paid for his works, and inherited some property from his parents, he died in poverty in 1662, at the hospital of St. Job, near Utrecht.

WATERMAN. The only large body of watermen in England are those employed on the river Thames at London. Before the introduction of coaches they were a very essential class for the conveyance of persons up and down the river, and to the various places on each side. The Thames was then the great highway.

An apprenticeship of seven years on the Thames constitutes a free waterman. The watermen and lightermen are an incorporated company, founded in 1556, and dependent on the corporation of the city of London. They are regulated partly by their own by-laws and partly by the 7 & 8 Geo. IV., c. 75.

WATERPROOF COMPOSITIONS. Many patents have been taken out for methods of rendering cloth and leather waterproof. Some of these protective agents may be noticed under the subdivisions of—solutions into which the cloth is dipped; varnishes applied to the surface; interlayers of caoutchouc composition; and waterproof composition for leather. In 1835 Mr. Hellewell, of Salford, took out a patent for a solution, which, by immersion, should render cotton and other fabrics waterproof; it is a composition of rock alum and whiting in water, and its action is aided by a subsequent application of soap and water. Mr. Hall, of Doncaster, patented in 1839 a method of waterproofing cloth by immersion; one solution described consists of alum, white-lead, and water; and another of alum, white lead, acetic acid, and water; and the cloth, after steeping in one of these solutions, is passed through a solution of quick lime, and a third time through a solution of boiled Irish moss, which acts as a mucilage. There are other patents of a somewhat similar character to the above, and there have also been numerous methods published but not patented.

The surface-application of a species of varnish has been the subject of many patents. A composition was introduced for this purpose some years ago, formed of linseed oil, pipeclay, burnt umber, white lead, pounded pumice-stone, and one or two other substances. This was not intended as a waterproof composition for ordinary clothing, but rather for tarpauling, awnings, coach-top covers, boat-cloaks, and other coarse materials. Mr. Newberry's patent, taken out in 1840, is for a mode of applying waterproof composition in such a way as to leave one side of the woven fabric free from its influence, thereby presenting to the eye a texture nearly resembling that of ordinary cloth. The method consists in saturating the cloth with the waterproof composition, and exposing one surface only, in such a way that the atmosphere, or artificial heat, may harden the composition on that surface into a dry membranous film; while the other side, after being kept moist during the drying of the first, is cleansed from the composition by means of spirit of turpentine.

The application of a layer of cement, gum, or varnish between two other substances, with a view to render the inner one impervious to water, has been practised under many different modifications, including that which is known by the name of the inventor, Macintosh. In the year 1824 Mr. Weise of Bermondsey devised a peculiar kind of fabric, which consists of fibrous materials spun into yarn; the yarn is dipped in caoutchouc solution before weaving; and in order to render the

meshes impervious to water, the cloth is drawn over a heated cylinder, whereby the composition is so far melted as to flow into them. The waterproof or Macintosh cloth is made by applying a layer of dissolved caoutchouc to cotton or other cloth. The cloth is stretched upon frames and brushed over with it; and the surfaces of two such pieces, while in a partially damp state, are laid one upon another, and pressed between rollers till they firmly and inseparably unite. The double fabric thus produced is wholly impervious to water, and is at the same time free from any adhesive substance on the surface.

The useful application of air for beds, cushions, seats, and similar articles, is dependent on the formation of air-tight cases; and this air-proof quality is brought about by nearly the same means as waterproofing. When a bag has been made of caoutchouc or similar cloth, and rendered also air-tight by somewhat similar means at the seams, air may be passed into it as a substitute for more solid materials. In practice there are some very neat arrangements adopted in effecting this. Temporary air-seats or cushions are made by forming a bag of air-tight cloth, perfectly enclosed at every part except one corner, where is inserted a small tube and stop-cock, capable of admitting or preventing communication from the interior to the exterior. The cock being opened, and the tube applied to the mouth, air is blown into the cushion, until it expands to the desired degree of fulness; the cock is then closed, and the air remains imprisoned. In this state the cushion is of a more equable kind than any one stuffed with solid materials; and if the envelope be well made, it will retain its efficacy for a long time. When not in use, such a cushion can have the air expressed from it, and may then be folded up into a small space.

It is obvious that seats, cushions, pillows, and beds of various kinds, having a similar object in view in respect to softness, fulness, and elasticity, may be made by similar means. When the quantity of air included in an envelope is greatly increased, it may be made the means of producing actual pressure in a more equable way than by any solid bodies. Thus, an air-tight bandage, so formed, is often used in surgical operations.

The patents for caoutchouc waterproof materials taken out by Mr. Hancock, Mr. Sievier, and other inventors, within the last few years, are so exceedingly numerous that we can only speak of them generally. One patent is for cutting cotton and other fibres into very small fragments, mixing them with dissolved caoutchouc, and forming sheets of material from this mixture. Another patent relates to a method, in which very thin sheets of caoutchouc are cemented by a solution of caoutchouc to gauze, bobbin-net, or other open material; and on this, as a ground, and with a similar cement of quick-drying caoutchouc, is laid a stratum of fibres. The fibres are pressed and dressed; and the open and extensible meshes of the gauze or bobbin-net give to the whole an elasticity which closely-woven textures cannot impart.

The attempts to render leather waterproof depend in general on the filling up of the small pores which have previously admitted the tannin, the substance imbibed being such as will repel or resist water. Many such compositions have been proposed at different times, of which the mention of a few will here suffice. Melt over a slow fire a quart of boiled linseed oil, a pound of mutton suet, three-quarters of a pound of yellow bees'-wax, and half a pound of common resin, or smaller quantities in the like relative proportions; and with this mixture saturate the leather of new boots or shoes, while the latter is slightly warm. Another method is to melt two ounces of yellow bees'-wax, two ounces of Burgundy pitch, and two ounces of turpentine, in a pint of linseed oil, and with this mixture to saturate the warmed leather. The 'Journal of the American Institute' gives the two following:—1. Boil together for half an hour one quart of linseed oil, two ounces of resin, and half an ounce of white vitriol, to which add four ounces of spirits of turpentine and two ounces of white oak sawdust, and apply this mixture to the leather by means of a brush. 2. Apply a coating of tallow to the leather; and after this has dried, coat it again with a mixture of one part of copaiba balsam with two of naphtha. Another mixture for this purpose consists of six ounces of caoutchouc boiled for two hours in two quarts of linseed or neat's-foot oil. Lastly, a mode has been much recommended of applying a hot mixture of two parts tallow and one part resin, with which the leather may be completely saturated, the resin imparting an antiseptic quality to the tallow.

WATERTOWN. [New York.]

WATFORD. [Hertfordshire.]

WATLINGTON. [Oxfordshire.]

WATSON, RICHARD, D.D., was born in August, 1737, at Heversham, near Kendal, in Westmorland, where his father was head master of the grammar-school, which office he resigned in the year of his son's birth, who however was educated under his successor. About the end of 1754 Richard was sent, on an exhibition of 50*l.* belonging to the school, to Trinity College, Cambridge. He obtained a scholarship in 1757, and became in 1767 one of the head tutors of Trinity College. Meanwhile he had taken his degree of B.A., when he was declared second wrangler; had been elected a fellow of his college, had graduated M.A., and been unanimously elected by the senate to the professorship of chemistry. This was a strange choice, for at that time Watson knew nothing of chemistry whatever. However he set to work at his new subject, and was able, in about fourteen months, to read his first course of lectures. He afterwards delivered other courses, and all were highly successful. In 1768 he printed a synopsis of the principles of the science under the title of 'Institutiones Metallurgicæ.' In 1769 he was elected a Fellow of the Royal Society, and he contributed many chemical papers to the 'Philosophical Transactions,' besides publishing several separate works on the science. In 1771 he was elected regius professor of divinity, although he was at the time neither D.D. nor B.D. In December, 1773, he married, and went to North Wales to take possession of a sinecure rectory,

procured for him by the Duke of Grafton, which after his return to Cambridge he was enabled to exchange for a prebend in the church of Ely. In 1780 he succeeded Dr. Plumptre as archdeacon of that diocese; the same year he was presented to the rectory of Northwold, in Norfolk; and in the beginning of the year following he received the rectory of Knaptoft, in Leicestershire.

In July, 1782, Watson was promoted to the bishopric of Llandaff, and almost immediately published 'A Letter to Archbishop Cornwallis on the Church Revenues,' recommending an equalisation of the bishoprics. He died June 4, 1816. The best known of his works are his 'Chemical Essays,' 5 vols., and his 'Apology for the Bible, in a Series of Letters addressed to Thomas Paine.' He left a work entitled 'Anecdotes of the Life of Richard Watson, Bishop of Llandaff, written by himself at different intervals, and revised in 1814,' which was published by his son.

WATT, ROBERT, a physician, is the author of the 'Bibliotheca Britannica, or a General Index to British and Foreign Literature,' 4 vols. 4to., Glasgow, 1819–1820; Edinburgh, 1821–1824. He was born in Ayrshire in 1774, and died at Glasgow, March 12, 1819. He was also the author of several medical treatises.

The 'Bibliotheca Britannica' is in two parts: the first containing an alphabetical arrangement of authors, with the published works of each in chronological order: the second, a similar arrangement of subjects, with an enumeration of the books treating of them, and references to the entry of each work under the author's name in the first part. The compilation was made amid the calls of a professional life, and without access to any extensive library; and having been carried through the press without the author's revision (for it was published after his death), is no doubt chargeable with many errors, as well as important deficiencies; but it is notwithstanding a remarkable performance for an individual, and a work of very considerable utility.

WATT, JAMES, was born at Greenock, Jan. 19, 1736. His father, who was for upwards of twenty years town-councillor, treasurer, and baillie of Greenock, made a fortune by trade, part of which however he lost before his death, in 1782.

Being of a delicate constitution, the early education of James Watt was in a great measure of a domestic character. About 1750 he amused himself by making an electrical machine. Chemistry was a favourite subject when he was confined by ill health to his father's dwelling. He studied natural philosophy in the popular work of S'Gravesande, translated from his 'Physices Elementa Mathematica,' and he also read works on surgery and medicine. In his 16th year Watt was apprenticed to an instrument maker in Glasgow. At the end of three years he removed to London, in 1755, and placed himself with a mathematical instrument-maker; but in little more than twelve months the state of his health compelled him to return to Scotland.

Shortly after his return from London, Watt endeavoured to establish himself in business in Glasgow, but owing to his not being a burgess he met with opposition from the corporations of arts and trades. The university however offered him an asylum within their precincts, where they permitted him to establish a shop; and they also honoured him with the title of their mathematical-instrument maker. These circumstances happened about 1757, and he retained his apartments in the university till 1763, in the winter of which year an event occurred to which the commencement of his invaluable discoveries may be most distinctly assigned. Professor John Anderson, who then occupied the chair of natural philosophy in the university, having requested him to examine and repair a small model of Newcomen's steam-engine, which could never be made to work satisfactorily, his sagacity led him to discover and remove the defects of this model; and he also discovered the imperfections of the machine itself, and was led to investigate those properties of steam upon which its action depended. The character of Watt's improvements will be found in the article Steam-Engine. About this time he left the college and took up his abode in the town previous to his marriage with his cousin, Miss Millar, in the summer of 1764.

The marriage of Watt released him from the difficulty which had compelled him to establish himself within the college, his wife being the daughter of a freeman. He then opened a shop in the Salt-Market, Glasgow, where he continued to make improvements in the steam-engine; and where, in addition to his employment as a mathematical instrument maker, he devoted much time to the practice of land-surveying. He afterwards adopted the profession of a civil engineer. In 1768 he found in Dr. John Roebuck an individual capable of appreciating the value of his improvements in the steam-engine, and sufficiently enterprising to support him in further experiments. The assistance of this gentleman enabled him to set up an engine, for which he obtained a patent, Jan. 5, 1769.

In the summer of that year however the mining speculations of Roebuck involved him in such embarrassments that he was compelled to abandon the experiments with Watt's engine, and Watt himself was obliged to return to his former avocations of engineer and surveyor. While engaged in surveying a line of canal between Fort William and Inverness, since executed by Telford under the name of the Caledonian Canal, Watt, in the latter part of 1773, received intelligence of the death of his wife; and he soon afterwards accepted an invitation from Matthew Boulton, the founder of Soho, to settle in England.

Boulton, to whom Dr. Roebuck transferred his share in the property of Watt's invention, was a man eminently qualified to bring it into profitable operation. Watt's connection with Boulton commenced early in 1774, and they remained in partnership until 1800, when Watt retired from business; but their friendship continued undiminished until Boulton's death.

At the latter end of 1774 Watt completed at Soho his fourth model engine, which was exhibited to a deputation from the Cornish miners, and to other persons competent to judge of its

performances, which were deemed highly satisfactory. Perfect however as was the action of the improved machine, the patentees knew that much remained to be done to bring it into extensive operation. They therefore applied to parliament for an extension of the term of their patent; and, although the application was met by a violent opposition, which occasioned great expense and anxiety to the patentees, it was ultimately successful, an act being passed in 1775 (15 Geo. III., c. 61), 'vesting in James Watt, engineer, his executors, administrators, and assigns, the sole use and property of certain steam-engines, commonly called fire-engines, of his invention, described in the said act, throughout his majesty's dominions,' for a period of twenty-five years from the passing of the act. Being thus secured a return for their outlay, the patentees prepared for the manufacture of steam-engines upon the most extensive scale, and with a degree of accuracy never before applied in the production of large machinery.

Of the spirited manner in which Boulton conducted the mercantile department of the great adventure some idea may be formed from the fact, that upwards of 47,000*l.* was spent before the patentees began to receive any return; but at length their remuneration began to pour in, and in no scanty stream. They were, however, put to great expense by legal proceedings against infringements of their patent, and in defence of the patent itself. At length, after a series of trials extending from 1792 to 1799, a unanimous and clear decision was given, fully vindicating and establishing the rights of the patentees.

In 1794 the sons of Messrs. Boulton and Watt were admitted to the partnership, and on the expiration of the extended term of his patent, in 1800, Watt resigned his share of the business to his two sons, and retired into private life.

As there were several scientific men residing about Birmingham who were on terms of intimacy with Watt and his partner, an association was formed under the title of the 'Lunar Society,' the members of which met monthly on the night of the full moon, for the purpose of social converse. At one of these meetings, according to Arago, a suggestion was thrown out which led Watt to the invention of the useful little machine known as the Copying Press, for which he obtained a patent. Towards the latter end of 1786, on a visit to Paris, undertaken at the instance of the French government for the purpose of suggesting improvements on the Machine de Marly, Watt became acquainted with Berthollet, whose method of bleaching with chlorine he brought to this country, and introduced, with certain improvements of his own, in the bleach-works of Mr. Macgrigor, near Glasgow, whose daughter he had married in 1775.

Concerning Watt's share in the discovery of the composition of water, an investigation in which he, Cavendish, and Lavoisier, were engaged about the same time, we must refer those who are curious to Arago's Life or 'Eloge' of Watt, and to the 'Historical Account of the Discovery of the Composition of Water,' by Lord Brougham.

One of the last of the projects to which Watt devoted his attention after his retirement from business was a machine for copying sculpture, with which he proceeded so far as to execute several specimens. He kept the construction of this machine strictly secret; but when he had proceeded sufficiently with his design to contemplate obtaining a patent, he found that another person in his neighbourhood was engaged upon a similar plan. A proposal was subsequently made for obtaining a joint patent, but Watt was unwilling, at so advanced a period of life, to embark in such an undertaking.

About 1790 Watt had purchased an estate called Heathfield, near Soho, where he resided to the end of his life; and he had also a property on the banks of the Wye, in Wales. It is related that, when upwards of seventy, he imagined his intellectual faculties to be on the decline, and accordingly determined to put them to the test by undertaking some new study. Having selected the Anglo-Saxon language for this experiment, he mastered it with a facility which proved that there was little ground for his fears. He died Aug. 25, 1819, in his 83rd year.

Of the private character of the great engineer a most pleasing account is given by Lord Jeffrey, who, after stating that, independently of his great attainments in mechanics, he was an extraordinary, and, in many respects, a wonderful man, observes, 'Perhaps no individual in his age possessed so much and such varied and exact information—had read so much, or remembered what he had read so accurately and well. He had infinite quickness of apprehension, a prodigious memory, and a certain rectifying and methodising power of understanding, which extracted something precious out of all that was presented to it. His stores of miscellaneous knowledge were immense—and yet less astonishing than the command he had at all times over them.'

In acknowledgment of his invaluable services it was intimated to Watt a few years before his death, that 'the highest honour usually conferred in England on men of literature and science was open to him, if he expressed a wish to that effect;' but while he felt flattered by the intimation, he determined to decline it. He became a member of the Royal Society of Edinburgh in 1784, of that of London in the following year, of the Batavian Society in 1787, and in 1808 a correspondent of the French Institute; and in 1814 the 'Académie des Sciences' of the Institute elected him one of its eight foreign associates. In 1806, by a spontaneous vote, the university of Glasgow conferred upon him the honorary degree of LL.D. In 1824 a subscription was entered into for a statue, which was sculptured by Chantrey, and is now in Westminster Abbey. Another statue by Chantrey adorns an elegant chapel erected by Watt's only surviving son, at the parish church of Handsworth, near Birmingham, in the chancel of which he was interred. Other statues have been erected in St. George's Square, Glasgow, and in the university of Glasgow.

WATTEAU, ANTOINE, was born at Valenciennes, in 1684. He went to Paris in 1702,

with a scene-painter, and was subsequently employed as a copyist. From this however he was soon rescued by Claude Gillot, a painter of some ability, who took, him into his house, and employed him to assist him in his works. Gillot painted landscapes, with grotesque figures, fauns, satyrs, &c., and the pupil soon surpassing the master in his own style, Gillot forsook painting and took to engraving. Watteau now acquired reputation rapidly: he was appinted Peintre de Fêtes Galantes du Roi, and was elected a member of the French Academy of Painting. In 1718 he came to England, where he remained a year. He returned to Paris in a very weak state of health, and died at Nogent in 1721.

Watteau's colouring is rich, and his drawing correct. His pictures generally represent balls, masquerades, garden parties, and similar scenes. His principal imitator was Lancret.

WATTLE-BARK. [Bark.]

WATTON. [Norfolk.]

WATTS, ISAAC, the eldest of nine children, was born at Southampton, July 17, 1674. His father, who kept a boarding-school in that town, was a man of strong devotional feeling and a rigid nonconformist. The child showed a taste for books at a very early age, and imbibed under his parents that turn of mind which prompted the determination to become a dissenting clergyman.

Isaac Watts was sent to the free grammar-school of his native town in his 4th year. In his 16th year he was sent to an academy in London, kept by Mr. Rowe, the minister of an Independent meeting-house. During the three years that he remained with Mr. Rowe, Watts pursued his studies with intemperate ardour, allowing himself no time for exercise, and curtailing the period allotted to sleep. He returned to his father's house in 1694, and spent the next two years of his life in private study.

In 1696 he was invited by Sir John Hartopp to reside with his family at Stoke Newington as tutor to his son. The first outline of the work afterwards published under the title of 'Logic' was prepared during this period for the use of his pupil.

Watts preached his first sermon on the day on which he completed his 24th year, July 17, 1698. In that year he was chosen assistant to Dr. Chauncy, pastor of an Independent church, in London, but he continued to reside and discharge his duties in Sir John Hartopp's family till 1702. In that year he succeeded Dr. Chauncy in the pastoral office. Soon after his entrance upon this charge he was seized with a dangerous illness, which left him with a constitution greatly impaired. Watts's health returned gradually, and he performed his duty, with the help of an assistant, till 1712, when he was seized by a fever, from the effects of which he never perfectly recovered.

This illness excited the lively sympathy of all his friends. The foremost in kind offices was Sir Thomas Abney, who invited him to try the effect of change of air at his house at Theobalds. Watts accepted his invitation, and went there intending to stay only a single week, but he remained six-and-thirty years—till his death. In 1728 he received from Edinburgh an unsolicited diploma of D.D.

Watts's usefulness among his flock was in no wise diminished by his residence at Theobalds. When he was incapable of public labour, he refused to receive his salary; and at all times a third part of his income was devoted to charitable uses. The seasons when indisposition incapacitated him from public duty were spent in literary composition. He died Nov. 25, 1748.

The following are the most important of Watts's publications:—'Logic; or, the Right Use of Reason in the Inquiry after Truth,' published in 1725. 'The Improvement of the Mind,' an expansion of Locke's 'Conduct of the Human Understanding.' 'Psalms and Hymns.' 'Divine Songs attempted in easy Language for the Use of Children.' The theological works of Watts are very numerous. His 'Three Dissertations relating to the Christian Doctrine of the Trinity,' and 'Nine Sermons preached in the years 1718–19,' published in 1812, with a preface by Dr. Pye Smith, may be taken as fair specimens.

WAVENEY. [Norfolk.]

WAVES AND TIDES. From the earliest times the periodical risings and fallings of the waters on coasts or in rivers have been noticed; and the recurrences of the phenomena depend so obviously on the positions of the moon and sun, that the influences of those celestial bodies in producing them have ever been assigned as their cause. The tide appears as a general wave of water which gradually elevates itself to a certain height, then as gradually sinks till its surface is about as much below the medium level as it was before above it: from that time the wave again begins to rise; and this reciprocating movement of the waters continues constantly, with certain variations in the height (with respect to the mean level), and in the times of attaining the maxima of elevation and depression.

Ordinary waves are produced by any cause which disturbs the equilibrium of the particles of a fluid. Thus a stone suffered to fall into water at rest gives rise to a series of concentric circular waves extending to a great distance from the place where the stone falls. The inequalities of the pressure of the air on the surface of water, whether at rest or in motion, when a gentle wind is blowing, will produce ripples; and if the action is continued long, the ripples, at a certain distance from the place of their origin, become considerable waves.

The summits of waves have a gentle curvature, while the height bears a small proportion to the length in the direction of the motion; but as the height increases, the summit becomes more acute, and assumes the form of a ridge; and when this becomes too sharp for the preservation of equilibrium, the force of the wind acting horizontally near the top breaks it into foam or spray. As waves advance towards a shore, the water becoming less deep, the resistance of the bed of the sea causes their lengths to diminish, and at the same time their heights to increase, so that the front of the wave becomes steep; and the motion of the

upper part, towards the land, being more rapid than that of the lower part, it follows that the summit is carried beyond the base, and, falling forward, there is produced what is called a *surf*. The breaking of waves over a sunk shoal depends chiefly on a like cause.

The waves of the sea do not extend to considerable depths: from the experiments made by the committee appointed by the British Association in 1836, it was found that with a depth of water equal to 12 feet, waves 9 inches high and 4 or 5 feet long did not sensibly affect the water at the bottom. Waves from 30 to 40 feet long, oscillating at intervals of 6 or 8 seconds, produced some effect, but much less than near the surface.

It must not be imagined that when water is agitated by waves its whole mass has the movement which at first sight appears from the observed progressive motion of the undulation. When from any cause, as the fall of a stone into it, the water becomes agitated, a series of horizontal motions to and fro are produced; and while in a slender vertical column of water these motions are equal and in one direction, the surface neither rises or falls; but if, in two neighbouring columns, the particles advance to meet each other, the water becoming compressed, the surface rises; if the particles recede from one another, those above descending by gravity, the surface falls. These different horizontal movements existing successively in the same vertical column, and simultaneously in those which are adjacent to each other, the surface of the water becomes undulated.

The varying attraction of the sun or moon on the particles of water in the ocean is alone sufficient to produce the perturbations by which waves are formed; and if it be assumed that the solid nucleus of the earth is covered entirely with water, both nucleus and water being originally spherical, those perturbations will bring the surface of the water to a spheroidal form, the longer axis being in the direction of a line joining the centres of the earth and the luminary; while, at the extremities of the shorter axis, the water is, in part, drawn away from the nucleus. There will consequently exist, at the same instant, two great waves whose summits are at a distance from one another equal to half the circumference of the earth.

By the diurnal rotation of the earth these tide-waves, as they may be called, would appear to move about the earth from east to west. Hence if a small island at the terrestrial equator were to project above the surface of the water, it would arrive successively at the points of greatest and least elevations, so that in the time of a rotation of the earth on its axis with respect to the celestial body, there would occur at the island two states of high-water and two of low-water. The arrival of the island at the summit nearest the attracting body, which would, if that body were the moon, take place at the end of every 24h. 50m. nearly, is called the *diurnal tide;* and that which takes place when the island arrives at the farthest summit, that is, 12h. 25m. after the former, is called the *semidiurnal tide.*

If an island having a great extent from the equator towards the north and south were to intercept the tide-wave, the elevated water, passing round the extremities of the island, would on its western side form two waves, which would advance towards and meet one another at the equator, making, at different places on the coast, high-water successively later in the directions of their motions. And it is easy to conceive that the tide-wave of a great ocean will send branches into any seas which it may approach in its movement about the earth: such are called *derived tides.*

The tides are greatly modified at any station or port by the position of the moon with respect to the equator. The two summits of the great tide-wave are, at the same instant, diametrically opposite to one another; and if the latitude of the station were equal to the moon's declination on a given day, both moon and station being for example north of the equator, the summit of the wave would on that day be at the station when the moon is in or near the zenith; but about twelve hours afterwards the station, having described half the circumference of a circle about the earth's axis by the diurnal rotation, will be on the opposite side of the meridian; and the summit of the wave, being on the southern side of the equator, will be at a distance from the station equal to twice the moon's declination; consequently the height of this tide will be much less than that of the former tide. The contrary phenomenon occurs when the moon and the station are on opposite sides of the equator.

The occurrence of high-water at any place is also observed to have a dependence on the position of the moon with respect to the meridian of the place; at a few ports it coincides with the time that the moon is on meridian, but in general it takes place some time before or after the culmination. The position of the moon at the time is however subject to certain variations even at the same port; and it differs considerably at different places. The elevations also of the water with respect to the mean level differ; in some places, during about half the year, the high tide which occurs when the moon is above the horizon is greater than that which occurs when the moon is below, and during the other half-year the phenomenon is reversed. In every place, at about the times of new and full moon, the high-tides attain their greatest elevation; and at about the times of the quadratures, the least: the former are called *spring-tides,* and the latter *neap-tides.*

In bays and harbours the time of high-water coincides with that at which the current ceases to flow, but this is not the case with the seas which communicate at both extremities with the ocean. For, if it be imagined that a tide-wave flows in at one of the extremities, this will cause an elevation of the waters; but the waters which are passing off at the opposite extremity cause, at the same time, a depression, or, at least, a diminution of that elevation; the surface therefore must be the highest when the current flows with equal rapidity at both extremities, and not at the moment preceding the turn of the tide. When the stream

continues to flow up for three hours after it is high-water, it is said to make *tide and half-tide;* if it continues to flow during one hour and a half, it is said to make *tide and quarter-tide,* and so on. Near the shores of the British Channel, probably in consequence of the obstructions caused by the land, or the disturbances at the mouths of rivers, the progressive movement of the tide-wave is more retarded than in the middle; and in some places the current has curvilinear motions, which, on the French and English sides, are in opposite directions. The *race* of Portland is a current produced by the tide-wave while advancing along the shore; being arrested by the promontory till it attains a height which allows it to flow off obliquely with considerable velocity.

The rise of a tide-wave near the mouth of a river takes place rapidly by the shoaling of the sea and the confinement of the wave between the banks; for the motion of a body of water is capable of raising the particles to the heights through which they must fall to acquire their actual velocities; and if the same motion is employed in raising a smaller quantity of water, it is evidently capable of raising it higher: thus, when the contraction is considerable, as in the Bay of Fundy, the Bristol Channel, and other places, the elevation becomes very great; at Chepstow it amounts to 60 feet. When, at the mouth of a river, the bed has a long and gentle slope on each side, the waves, becoming high and steep, fall over, and flow up rapidly with a surf, constituting what is called a *bore:* the bore-wave which enters the Severn is 9 feet high, and that which occurs in the Amazons is said to be from 12 to 15 feet in height. In flowing up a river the summit of a tide-wave reaches the different stations later as these are farther from the mouth; and in the Thames it advances from Margate to London, a distance of 70 miles, in three hours. It is observed also that the current of a river runs upward during some time after the summit has passed any station, and downwards for some time after the surface of the water is at the lowest; the intervals between the times of low and high water, moreover, gradually diminish as the stations are farther up, while the intervals between high and low water increase.

The only tide-waves with which we can be said to be well acquainted are those of the Indian and Atlantic Oceans; and from the known times of high-water at different places, it is ascertained that the summit of a wave advances from the seas to the south of Australia into the Bay of Bengal, and towards the Persian Gulf, causing the hour of high-water to be successively later at the ports from Ceylon northwards, on both sides of the western peninsula of India. The summit of a single wave seems to extend from the mouth of the Red Sea, along the eastern coast of Africa, to the Cape of Good Hope, where it joins the tide-waves of the Atlantic. These advancing northwards, cause the time of high-water to be successively later at the different ports on the western coast of Africa and Europe, and on the whole eastern coast of South and North America; so that the wave which at a certain instant is at the Cape, in 15 hours from that time is at the mouth of the English Channel, and on the western coast of Ireland. This wave, being apparently checked in its progress by the British Isles, divides itself into two principal branches, of which one flows up the Channel, and passing through the Straits of Dover, is off the mouth of the Thames in 8 hours from the time that it was at Brest. A small branch advances up St. George's Channel; but the second principal branch of the wave flowing round the northern extremity of Scotland, proceeds slowly down the North Sea, and meets the first branch in 20 hours from the time that it was at the entrance of the Channel.

In 1740 the Académie des Sciences offered a prize for the best memoir on the theory of tides; and the paper by Daniel Bernoulli on the flux and reflux of the sea shared it with those of Euler and Maclaurin. In that paper it is assumed that the water is kept in equilibrio between the attractions of its particles towards the earth's centre of gravity and the disturbing forces exercised by the sun and moon. The theory adopted by La Place, in which there are taken into consideration the laws of the motion of fluid molecules when acted on by attracting forces, was a great improvement on that of the mathematicians before mentioned; and it is found to produce a more near agreement with the observed phenomena. The elaborate investigations of La Place will be found in the 'Mémoires de l'Académie des Sciences' for the years 1775, 1776; and in the first and fourth books of the 'Mécanique Céleste.' But the subject of waves and tides has been treated in conformity to the theory of undulations by Mr. Airy, the astronomer royal, in a valuable essay which is published in the 'Encyclopædia Metropolitana;' and to that essay we must refer the reader for the investigations. These, though admitting of general application, are particularly adapted to the phenomena of tides in rivers and arms of the sea; and they are conducted by an analysis within the reach of persons acquainted with the ordinary processes of the differential and integral calculus.

WAVRE. [BRABANT, SOUTH.]

WAX. There are several varieties of this substance. *Bees'-Wax* is a secretion from the ventral scales of the bee. With this substance the comb is constructed. From the comb the wax is extracted chiefly by pressure and by melting it in hot water, in which the impurities subside, after which the wax is poured into moulds. The wax has a yellowish or orange colour. Its odour is peculiar. Even in winter it is soft enough to be indented by the nail, and in summer it is much softer. It melts at about 143° to 150° Fahr. It is a non-conductor of electricity.

White Wax is obtained by melting yellow wax by means of steam, running it off into a perforated trough called a Cradle, from which it falls into water. By this means the wax is solidified and converted into a kind of ribbon; it is afterwards bleached, re-melted, re-bleached, and refined. Pure wax thus obtained is nearly devoid of smell, and is white with a yellowish tint; it is brittle

and insipid; its melting point is 158° Fahr., and it solidifies at 149°.

Chemists differ considerably in opinion as to the nature of wax; some supposing it is a homogeneous body, while others are of opinion that it consists of two different substances, *Cerine* and *Myricene*. When wax is strongly heated it is decomposed into carbon, hydrogen, and oxygen.

Several plants yield waxy products, as the *Myrica cerifera*, the *Ceroxylon Andicola*, and others.

Sealing-Wax is not properly a wax. It is composed of shell-lac (4 parts), Venice turpentine (1 part), and cinnabar (3 parts). The round sticks of sealing-wax are made by hand on a smooth slab of marble, which is kept at a moderate temperature by a brazier or chafing-dish placed beneath it. A quantity sufficient to make about six sticks is rolled out on the slab into one long stick, which, when of proper diameter, is cut into lengths. The sticks are then rolled on a cold slab beneath a smooth piece of wood or metal, and are afterwards polished by gently fusing the surface, and devices are stamped upon them. Sticks of a more complicated shape are cast in moulds. For the best black sealing-wax, the finest ivory-black is substituted for the cinnabar. Inferior materials are used for cheap wax. Soft sealing-wax contains bees'-wax in the place of the shell-lac.

WAX-PALM. [Ceroxylon.]

WAX-WING. [Bombycilla.]

WAY, *Chimin* (from the French *Chemin*), is a term used to denote either a right, in one person or more, of passing over the land of another, or the space over which such right is exercisable. In the former sense a way is an incorporeal right of the class called Easements.

There are five kinds of way: 1, a foot-way, for persons passing on foot only; 2, a horse-way, for persons passing on horseback, but including a foot-way; 3, a drift-way, for driving cattle; 4, a carriage-way, for leading or driving carts and other carriages, always including a foot and horse-way, and usually, but not necessarily, including a drift-way; 5, a water-way, for ships and boats. [River.]

All these may be either private or public ways. Private ways are enjoyed by particular persons or classes; public ways are open to all persons; hence such a way is said to be, in the language of pleading, a common and public queen's highway.

I. The proper origin of a private right of way is a grant from the owner of the soil.

Such a grant may be made to a party, or to him and his heirs *in gross*, that is, without respect to any land or house of which he may be the owner or occupier: or to the grantee, his heirs, and assigns, being owners of such a house or close; in which case the right granted will be appurtenant to the house or close to which the grant is annexed, and the right will pass with the house or close.

The grant of a way may be either express or implied. If a man at the time when he conveys part of his land to another has no access to the land conveyed, except over the land which he reserves, the grant of a right of way over the land reserved is implied. If a man conveys part of his land, and has no access to the part reserved, except over the land conveyed, a right of way over the land conveyed is impliedly reserved. The way so impliedly granted or reserved is called a 'way of necessity.'

The rule of law as to prescription for ways is settled by 2 & 3 Wm. IV., c. 71, s. 2.

The party to whom a private road is allotted under the general enclosure act has a *statutory* right of way.

A private right of way may be extinguished by a deed of release executed by the party who is entitled to such way; and such a release may be presumed from a non-user for 20 years, or from a declaration made by the party that he has no such right.

By the general enclosure act (41 Geo. III., c. 102) all roads, private as well as public, within the district, not set out by the commissioners, are declared to be extinguished.

The grantee cannot throw the burden of repairing the way upon the grantor, unless by the terms of the grant, evidenced by the deed or by user, the grantor has engaged to enable the grantee to use the way.

II. Between private ways and public ways stand what may be called *quasi public ways*, which partake of the qualities of both, but differ in some respects from each. Such are ways which the inhabitants of a town, &c., have immemorially used from their town, &c., to a church or market. A right of this description cannot now be created.

III. A highway is created where the owner of the soil has, by express words or by some act done or forborne, declared his intention that the public shall have the use of a way over such soil.

A highway is frequently created by statute, principally under enclosure acts.

Whatever may have been the origin of a highway, it cannot, at common law, be destroyed or altered, except after an inquisition taken upon a writ of 'ad quod damnum.'

By the common law the burthen of maintaining highways is thrown upon the occupiers of lands and tenements within the parish, or rather within the township in which the way is situated. But particular persons may be bound to repair a highway.

Any obstruction or other nuisance in a highway may be abated or removed by any person. The wrong-doer may also be proceeded against by indictment as for a misdemeanor.

The regulation of highways has frequently been made the subject of legislative interference. The statute now in force is the 5 & 6 Wm. IV., c. 50.

WAY, MILKY. [Milky Way.]

WAYS, ROMAN. Our old chroniclers give this name to four principal ancient highways which they suppose to have been either originally formed by the Romans in Britain during their occupation of the country, or at least to have been completed by them upon lines of road for the greater part already traced and used by the

former inhabitants. The names however appear to be Saxon in form, though they may be Roman or British in etymology :—Watling Street, Ikenild Street, Ermin Street, and the Fosse. Watling Street is generally held to have extended from Dover through Canterbury to London, where it passed along the line of Watling Street in London, meeting the other three great roads at the central milliarium in Cannon Street, pointed out by the site of London Stone. Thence it ran through Verulam (or St. Albans), Hertfordshire, and Dunstable in Bedfordshire, to Stony Stratford in Buckinghamshire, whence it skirted Leicestershire on the west to Bosworth. From this point its course is disputed, some making it proceed in a N.W. direction to Chester, others carrying it due N. to York, and thence to Chester-le-Street, in Durham. Ikenild Street is said to have commenced on the eastern side of the island in the country of the Iceni, and to have passed through London. The course westward is extremely obscure : nearly all that has been even conjectured on the subject is, that it crossed the Watling Street at Dunstable, and thence extended in the direction of Staffordshire to the western coast. Ermin Street is conjectured by some to have extended from St. David's, at the S.W. extremity of Wales, to Southampton ; by others, to have stretched more directly across the country to London. The Fosse is supposed to have taken its course from S.W. to N.E., beginning near Totness in Devonshire, and passing through Bristol, Cirencester, Chipping Norton, Coventry, Leicester, and Newark, to Lincoln, and thence to London. The 'Itinerary' of Antoninus however makes 15 itinera or roads in Britain.

WEANING, the act of separating a child from the partaking of its mother's milk as food. The time for weaning must depend in some measure both on the development and health of the child and the state and health of the mother. With regard to the child, one of the first indications that weaning may be commenced is the appearance of teeth. This is indicative of preparation for other kind of food, and generally occurs in healthy children about the sixth or seventh month ; and it is at this period that a gradual abstraction of the breast may commence. If this be done it is seldom that a child will require suckling beyond the first year. Where children are backward in the development of their teeth, and present other signs of want of strength and delicacy of constitution, it is frequently advisable that they should remain a lengthened period at the breast. It is always necessary to take into consideration the health of the mother during suckling, as children may suffer much more severely from an imperfectly secreted or diseased state of the milk than they would from immediate weaning.

WEAR. [Weir.]

WEAR, River. [Durham.]

WEARING. [Veering.]

WEARMOUTH. [Sunderland.]

WEASELS (*Mustelidæ*), a family of the *Carnivora*, remarkable for ferocity and predatory habits.

Under this family the following genera may be arranged :—*Gulo*, *Galictis*, *Mustela*, *Martes*, *Mephitis*, *Mydaus*, *Zorilla*, and *Lutra*, including *Enhydra*, or the Sea Otter. To these we may add *Meles*, *Taxidea*, *Ursitaxus*, *Mellivora*, &c. [Badger ; *Mellivora* under Ursidæ ; Otter.]

To the genus Gulo attention has already been paid. From this genus Mr. Bell has separated the genus *Galictis*, including the Grisons, *Galictis vittata*, Bell, a native of Guiana, Paraguay, and Brazil ; and *Galictis Allemandi*, also from South America. In these animals, as in the *Mustelidæ* in general, there are anal follicles which secrete a fetid unctuous matter. The feet are subplantigrade. The Grison is the *Fouine de la Guyane* of Buffon. Allamand's Grison appears to be the *Taira* or *Galera* of Brown. Habits, those of the Polecat.

The genus *Mustela* (*Putorius*, Cuvier) includes the Polecat, Ferret, Weasel, &c. Animal of slender form, of small size, but excessively sanguinary. The feet digitigrade. Muzzle shorter and stouter than in *Martes*. All the species diffuse a disagreeable odour. The genus Mustela is widely distributed. Three species inhabit the British Islands and also the Continent of Europe, viz., the Polecat (*Mustela Putorius*), the Weasel (*M. vulgaris*), and the Stoat or Ermine (*M. erminea*.) The Ferret (*M. Furo*), kept in a half-reclaimed state, for the extirpation of rats and the catching of rabbits, is originally from northern Africa.

The daring, obstinacy, and bloodthirstiness of our British *Mustelidæ* are well known. They are very destructive in preserves of game, attacking eggs and young birds, together with leverets and hares ; nor are they less mischievous in the poultry yard. The Weasel and Stoat however do great service in clearing barns and stables of rats and mice. The skin of the Polecat and of the Ermine in its winter dress are in request—that of the Ermine is very valuable.

The *Weasel* is *La Bellette* of the French ; *Donnola* and *Benula* of the Italians ; *Comadreia* of the Spanish ; *Wisel* of the Germans ; *Weezel* of the Dutch.

The Weasel, small as it is, will attack dogs and even men when its nest is invaded. This is framed of dry leaves and herbage, and is generally lodged in some snug locality, such as a crevice in a bank or old wall, the hollow of a tree, &c. The young are four or five in number, and the number of litters is two or even three in the course of the spring and summer. The Weasel swims well, climbs trees and walls, and pursues its prey both by the scent and sight with great perseverance.

The *Stoat*, or *Ermine*, is larger than the common weasel, exceeding nine inches in the length of the head and body, the tail being rather more than four inches. The Stoat is *L'Hermine* and *Le Roselet* of the French ; *Armellino* of the Italians ; *Armino* and *Armelina* of the Spanish ; and *Hermelin* of the Germans.

This species is of a reddish brown above ; white beneath, with the tip of the tail black. In winter the fur becomes white, with a tinge of pale yellow, the black tip of the tail remaining unchanged. In high northern regions the fur becomes of a pure white.

The Ermine is spread over Europe generally, but is common only in the north. The finest ermine skins, that is, those with the longest and thickest fur, and of the purest and brightest colour, are imported from the high latitudes. Russia, Norway, Siberia, Lapland, furnish them abundantly. In America an allied species, *M. Richardsonii*, Bonap., is found from the most northern limits to the middle districts of the United States.

The *Polecat*, *Fitch*, or *Fitchet*, is also the *Foumart* of the British. It is the *Putois* of the French; *Foetta* and *Puzolo* of the Italians; *Putoro* of the Spanish; *Ulk* and *Buntsing* of the Germans.

This species is larger than the Stoat, the length of the head and body exceeding one foot five inches, that of the tail being about six. The fur is of two kinds, a short woolly fulvous yellow under fur, and an outer dress of long brownish black and glossy hairs; the mixture of these two produces a very agreeable effect, varied according to the proportions of the two sorts. The Polecat is generally distributed through Europe. It is common in the temperate parts of Europe, but grows scarcer in Siberia. The fur of this species, though inferior to that of the Sable or Marten, is nevertheless esteemed, and there is a considerable importation of the skins annually to this country from the north of Europe under the name of *Fitch*. The Polecat will breed with the female Ferret, and the mixed progeny is superior to the pure Ferret in hardiness, size, and determination.

Of foreign *Mustelidæ*, we may mention the Chorok from Siberia (*M. Sibirica*), the Polish Weasel (*M. Sarmatica*), a native of southern Russia, and the Mink (*M. lutreola*). The Mink is amphibious in its habits, frequenting the rivers of the north and east of Europe, from the Arctic Sea to the Black Sea. Its odour is musky, and its fur very beautiful.

North America presents us with an Ermine (*M. Richardsonii*, Bonap.), with the Mink or Vison (*M. Vison*), resembling the European Mink in habits, and Cicognani's Weasel (*M. Cicognanii*, Bonap.), regarded by Dr. Richardson as identical with our common Weasel.

Several striated species are peculiar to Africa. They constitute the subgenus *Zorilla*. Example, *Zorilla Capensis*, striated with black upon a white ground.

The genus *Martes*, the *Marten*, in our island and on the adjacent continent, presents two varieties, by many naturalists regarded as distinct species, but as we think upon very unsatisfactory grounds. These are—the Beech or Stone Marten (*Martes Fagorum*, Ray), distinguished by a white throat; and the Pine Marten (*Martes Abietum*, Ray; *Mustela Martes*, Linn.), distinguished by a yellow throat.

Regarding the *Beech Marten* and *Pine Marten* as varieties of one species, the same details, the colouring of the throat excepted, apply to both. The length of the head and body is about 18 inches, that of the tail about 9 inches or rather more. The fur is deep and full, especially during the winter, and is very beautiful.

It is said that the Beech Marten, though often found in woods, prefers stony and rocky localities, and affects the vicinity of farm-yards and homesteads; while the Pine Marten is more recluse, and frequents the deep forests.

These active and graceful animals swim well, and climb trees with the address of a squirrel; they prey upon birds and small quadrupeds, and are very destructive in preserves of game. They breed in the hollows of trees and the crevices of rocks. The nest is constructed of leaves and dried herbage, and the young are generally about three.

With respect to the Pine Marten of America, of which thousands of skins are annually imported into England, Dr. Richardson states that it inhabits the northern regions from the Atlantic to the Pacific in great numbers, and that it is observed to be particularly abundant where the trees have been killed by fire, but are still standing. It is rare where wood is wanting.

From the north of Europe we receive annual importations of the skins of the Stone Marten, and also of the more valuable Pine Marten, and the fur of the latter is generally called *Sable*. It has been supposed however, by Pallas and others, that the true Sable, or Zibeline (*Martes Zibilina*), of north-eastern Europe and northern Asia, is distinct from the Pine Marten, and not a mere variety with fur rendered deeper and fuller in consequence of the rigorous winter of the latitudes it inhabits.

The genus *Mephitis* comprehends the Skunks or Mephitic Polecats of America, the *Bêtes Puantes* and *Enfans du Diable* of the French.

These animals, the disgusting odour of which is insupportable, are all natives of America. Many species have been described.

We select as an example the Hudson Bay Skunk (*Martes Americana*, var. *Hudsonica*).

The *Skunk* is low on its legs, with a broad fleshy body, wide forehead, and the general aspect rather of a Wolverene than of a Marten. The eyes small, ears short and round. The hair on the body is long. The tail is also covered with very long hair.

Dr. Richardson states that the Skunk is not an uncommon animal in the district it inhabits, which does not he believes extend to the north of lat. 56° or 57°. It is found in the rocky and woody parts of the country, but is still more frequent in the clumps of wood skirting the sandy plains of the Saskatchewan.

The Skunk lays itself up in a hole for the winter, seldom going abroad at that season, and then for a short distance only. Mice and frogs in summer are its principal prey. It has from six to ten young at a litter, and is said to breed but once a year.

Unlike the more agile weasels, the Skunk is slow in its motions, and consequently easily overtaken. Its defence consists of a fetid discharge, which is described as absolutely intolerable. The stench is insupportable to some dogs, and obliges them to let their game escape; others, by thrusting their noses into the earth, renew their attacks till they have killed it. They hide themselves in hollow trees and rocks, and are found in most

of the northern continent of America. Their food is insects and wild fruit.

Closely allied to the genus *Mephitis* is the genus *Mydaus*, the characters of which are as follows:—Five toes on each foot; claws proper for digging, very large on the fore-feet, moderate on the hind-feet; tail rudimentary.

Example, *Mydaus meliceps*, a native of Java. This is the *Mephitis Javanensis* of Raffles.

Dr. Horsfield states that this species is exclusively confined to those mountains which have an elevation of more than 7000 feet above the level of the ocean; and on these it occurs with the same regularity as many plants. 'The long-extended surface of Java,' continues Dr. Horsfield, 'abounding with conical points which exceed this elevation, affords many places favourable for its resort. On ascending these mountains the traveller scarcely fails to meet with our animal, which, from its peculiarities, is universally known to the inhabitants of these elevated tracts; while to those of the plains it is as strange as an animal from a foreign country. In my visits to the mountainous districts I uniformly met with it, and, as far as the information of the natives can be relied on, it is found on all the mountains.'

Most of these mountains and ridges are cultivated for the production of wheat and European vegetables and fruits, such as potatoes, cabbages, peaches, and strawberries in a deep vegetable mould, where this animal ranges, and in its search for food (worms, larvæ, &c.) injures the plantations and destroys the roots. It turns up the earth with its nose like a hog. This animal, when pursued or irritated, ejects a fetid matter, which is very volatile, and consequently spreads to a great extent. The entire neighbourhood of a village is sometimes infected by the disgusting odour.

WEATHER is a term used to denote the state of the atmosphere with respect to heat or coldness, dryness or humidity, wind, rain, &c.

In some countries the variations of the atmospherical phenomena occur in an order which is nearly constant; and in those regions predictions concerning the weather for several days, and even for months to come, may be made with almost a certainty that they will be verified by the event. Thus along the Malabar coast there is a clear sky from September to the following April, and on the coast of Coromandel the fair season continues from April to September; while during each following six months, in the two regions, it rains almost incessantly. Alternations of fair weather and rain also take place regularly in the interior of Africa and South America. But in insular situations generally, and in Europe and North America particularly, the winds, varying in direction and intensity according to no constant law, mingle together at irregular intervals of time the masses of air which abound with vapour raised from the ocean, and thus cause clouds to cover the horizon, and showers of rain, hail, or snow to descend.

The only indications of rain or fair weather upon which any reliance may be placed are those which have been noticed by the late Sir Humphry Davy, in his 'Salmonia;' and as his explanations are founded on physical conditions, a brief statement of them may with propriety be introduced in this place.

One of the speakers in the Dialogue inquiring why the clouds in the west being red, with a tinge of purple, should portend fair weather, is answered that the air when dry refracts more of the red and heat-making rays than when moist. It is added that a coppery or yellow sunset foretells rain.

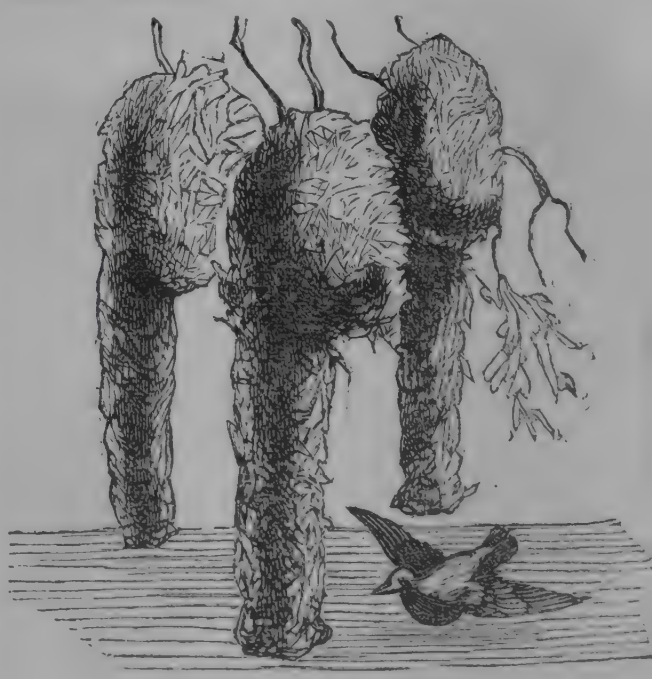
In explaining why a rainbow in the morning betokens rain, and one in the evening fair weather, it is stated that the bow can only be seen when the clouds depositing the rain are opposite to the sun; thus in the morning the bow is in the west, and in the evening in the east: and as the rains in this country are usually brought by westerly winds, a bow in the west indicates that the rain is coming towards the spectator; whereas a bow in the east indicates that the rain is passing away from him.

The indications of fine weather from swallows flying high, is explained by stating that the insects on which these birds feed delight to fly in a warm stratum of air; and when the warm air occupies a higher part of the atmosphere the birds find their prey in the upper regions. On the contrary, when the warm air is near the surface of the earth, the insects and birds are there also; and then, as the cold air from above descends into it, a deposition of water takes place. The reason why sea-birds come to land previously to a storm is that, as the fish upon which the birds prey go deep into the water during storms, the birds come to land merely on account of the greater certainty of finding food there than out at sea.

WEATHER-GLASS. [BAROMETER.]

WEAVER. [CHESHIRE.]

WEAVER BIRDS, *Ploceinæ*, a subfamily of FRINGILLIDÆ, of which the genus *Ploceus* is the type. The birds of this genus are the *Tisserins* (or Weavers) of the French, so called from the elaborate hanging nests which they construct, generally in company with others of the same species, thereby establishing colonies having a common interest.



Nests of Weaver-Birds.

To this subfamily may be referred the genera *Vidua* [VIDUA], *Euplectes*, *Ploceus*, *Amadina*, *Philetærus*, *Plocepasser*, *Textor*, &c.

Locality, the Old World only, especially Africa.

We can only notice a few species by way of illustration. Barrow ('Travels in Africa') describes the suspended nests of a species of *Euplectes* or *Ploceus*, as being very remarkable. These birds, several uniting to form a small colony, always build on a branch stretching over a river or pool of water. The nest is shaped exactly like a chemist's retort, and is suspended from the head; the shank or tunnel, at the bottom of which is the aperture, almost touches the water. It is made of green grass, curiously interwoven.

Another species of the genus, *Philetærus*, Smith (*Loxia socia*, Latham), fabricates a republic of nests in one clump, and under one roof or cover, the entrances to the separate nests being on the under side of what is not unlike a dense piece of thatch.

Paterson thus describes the operations of these social winged citizens:—'The industry of these birds seems almost equal to that of the bee. Throughout the day they appear busily employed in carrying a fine species of grass, which is the principal material they employ for the purpose of erecting this extraordinary work, as well as for additions and repairs. Though my short stay in the country was not sufficient to satisfy me by ocular proof that they added to their nests as they annually increased in their numbers, still, from the many trees which I have seen borne down by the weight, and others that I have seen with their boughs completely covered over, it would appear that this is really the case. When the tree that is the support of this aërial city is obliged to give way to the increase of weight, it is obvious that they are no longer protected, and are under the necessity of building in other trees. One of these deserted nests I had the curiosity to break down, to inform myself of the internal structure of it, and found it equally ingenious with that of the external. There are many entrances, each of which forms a regular street, with nests on both sides, at about two inches' distance from each other. The grass with which they build is called the Boshman's Grass, and I believe the seed of it to be their principal food, though, on examining their nests, I found the wings and legs of different insects.'

Another weaver bird's nest, that of *Ploceus icterocephalus*, Sw., brought, together with the male, female, and eggs, from South Africa to Mr. Swainson, is thus described by him:—'The nest is somewhat kidney-shaped, seven inches long, and four and a half broad: it is attached to a very slender branch, from which there are four other young shoots, which serve as so many holds for its support, and to which it is firmly fixed by bendings of strong grass leaves. The whole is very compactly made of the same materials, interlaced most ingeniously, and far more firmly than what is seen in the chaffinch or other of our most skilful builders: the lining is the heads or panicles of the grasses, thus uniting softness and coolness, the latter being an obvious advantage in so sultry a climate. The aperture is lateral, near but not upon the top, so that it serves the purpose of a window to the inmates, who are sheltered overhead by the convex top of the nest. There is something very ingenious in the construction of this opening, which is not, as it first appears, round, but semicircular, the arch being bound round with a stronger band than usual, and the plane or base much stronger, and composed of straight pieces of the stalks of grass, evidently for the purpose of giving to that part upon which the birds perched greater strength and substance.'

Dr. Smith, in his 'Zoology of South Africa,' a considerable portion of which he accurately observed with the eye of a philosophical zoologist, expresses his decided opinion that the fear of injury from small quadrupeds and snakes operates upon the birds of that country in their choice of trees overhanging pools of water as the localities for their nests. 'There can be no doubt,' says he, 'that parental affection dictates the choice. All the birds of South Africa are liable to have their nests robbed by small quadrupeds and snakes, and as no position is so likely to secure them against such misfortunes as those we have mentioned, they are doubtless selected under that conviction.'

Another interesting species is the *Plocepasser Mahali* of Dr. Smith, who first saw this bird upon a tree on one of the tributaries to the Orange River, in South Africa. The nests in figure and texture had many of the characters of those of *Ploceus*, but were armed in a curious manner. The walls of each nest were composed of stalks of grass, the thickest extremities of which were so placed as to protrude externally for several inches beyond the compact structure destined to contain the eggs. Thus each nest appeared armed with numerous projecting spines, and bore considerable resemblance to the body of a porcupine with its spines partially erected. Several of the *Pyrgitæ*, Dr. Smith remarks, arm their nests after the same fashion, but they select for the purpose the delicate twigs of shrubs or brushwood, instead of stalks of grass. The object of both is, he observes, to offer an obstacle to the advance of snakes towards the eggs and young.

Dr. Smith thus describes the habits and manners of another remarkable species, viz. *Textor erythrorhynchus*:—'It was not till after we had passed to the northward of the 25th degree of south latitude,' says Dr. Smith, 'that we discovered this bird; and, if we are to believe the natives, it rarely extends its flight farther to the southward, which they attribute to the scarcity of buffaloes south of that parallel. Whenever it was discovered it was always in attendance upon herds of the animals just mentioned, and either flying over the members of which the group was composed, or else perched upon the back of some individual animal. While perched, it appeared generally to be employed in collecting articles of food from the hide; and while so occupied it passed quickly from one part of the buffalo to another, without the latter appearing to bestow the slightest attention upon its movements. On opening the stomachs of the specimens we procured, we found what we had been

aided by other intricate apparatus, throw the stocking-yarn into such curvatures as to enable the needles to form the loops. The weaver has a bobbin of yarn at one side of his frame, from which he unwinds enough to lay across all the wires; he then, by moving certain treadles with his feet and levers with his hands, forms this length of yarn into a row of loops; and at the next movement, when forming another row of bends or loops, he links the one row into the other, so as to form a kind of chain, which chain extending both lengthwise and across, constitutes the web of the stocking. Machines have been invented which will enable the workman to produce twelve stockings at once.

Pile-Weaving.—If we examine *velvet, fustian, velveteen, moleskin, doeskin,* or a *Turkey* or *Wilton carpet,* we shall find that in all of these fabrics the warp and weft threads are almost concealed by a kind of down, nap, or pile, which imparts a peculiarly soft and smooth texture to them. Fustians are in fact a kind of cotton velvet, as Turkey carpeting is a woollen velvet. A few details of this kind of weaving will be found under CARPET; FUSTIAN; VELVET.

Power-Weaving.—In 1678 M. de Gennes invented a rude kind of weaving machine, intended to increase the power of the common loom; and other looms were invented which were to be worked by a winch, by water-power, or by some contrivance more expeditious than the common hand-weaving; but a greater step in advance was made by the invention of Dr. Cartwright's power-loom in 1785. [CARTWRIGHT.]

One cause which delayed the adoption of power-looms was the necessity for stopping the machine frequently, in order to dress the warp with paste or size, as it unrolled from the beam, which operation required a man to be employed for each loom, so that there was no saving of expense. But the successive inventions of Radcliffe, Horrocks, Marsland, Roberts, and others, have since brought the dressing-machine and the power-loom to a high state of efficiency.

If we take a piece of calico as the representative of plain fabrics generally, the mode of proceeding in power-loom factories may be shortly sketched as follows:—The *warping-frame* is so arranged as to be worked by steam-power, and to bring the yarns into a parallel layer, which is transferred to the *dressing-machine.* This latter is a large piece of mechanism, in which the threads dip into paste on their way to the warp-beam; undergoing a process of brushing after the dipping. After this dressing the *drawing* and mounting for the loom are attended to. When the warp is properly arranged in the loom, steam-power does all the rest: it forms the shed or division of the warp into two parts; it throws the shuttle; it drives up the weft with the batten; it unwinds the warp from the warp-roller; and winds the woven material on the cloth-roller.

WEBBE, SAMUEL, was born in 1740. His father died suddenly in his early youth, and his mother, unable to give her son a liberal education, apprenticed him to a cabinet-maker in 1751. On the completion of his term however he abandoned the trade, and by industry and patience was enabled not only to support himself by copying music, but to acquire, in addition to Latin, a knowledge of the French and Italian languages. He had also been initiated into the principles of music, in which science he now began to give lessons, and soon after to compose. As a composer, at the age of 26, he gained a gold prize-medal from the Catch-Club for the best canon. From that year (1765) to 1792 Mr. Webbe had twenty-seven medals awarded to him by the same club, for glees, catches, canons, and odes.

In 1784 he was appointed to succeed Mr. Warren Horne, as secretary of the Catch-Club; and in 1787, on the establishment of the Glee-Club, he became a professional member and the librarian. It was for this society he wrote both the words and music of his popular glee, 'Glorious Apollo.'

Mr. Webbe's glees, &c., amount to the large number of one hundred and seven. Besides these he produced masses (being a Roman Catholic), anthems, single songs, &c., some of which are yet well known. He died in 1817.

WEBER, CARL-MARIA VON, was born in December, 1786, at Eutin in Holstein. His education was conducted with care; and as his father had acquired a reputation as a violinist, he, perhaps unconsciously, influenced his son in his choice of music as a profession, although he had shown much talent while a boy as a painter. His father about 1797 took him to Salzburg, and placed him under the tuition of Michael Haydn, brother of the illustrious composer, under whom however the pupil did not make much progress. At Salzburg, in 1798, his father printed his first production, consisting of six Fughetti, which was favourably noticed in the German 'Musical Gazette.' Shortly after this he went to Munich, where he received lessons in singing from Valesi, and in composition from the organist of the chapel royal, M. Kalcher, to whom he says he was much indebted. Under the eye of his master he composed an opera, 'Die Macht der Liebe und des Weins' (The Power of Love and Wine). He also wrote a grand mass and some other works, all of which he tells us were 'wisely committed to the flames.'

After this his attention was for some time diverted from music by the art of lithography, which had just been discovered, and in which he believed himself to be the author of several improvements; but this novelty soon tired him, and he returned to his proper pursuits, and set to music Steinberg's opera, 'Das Waldmädchen' (the Wood-Maiden), which was performed in 1800, and spread further than, at his maturer age, he thought desirable. Being called to Salzburg, he there, in 1801, composed 'Peter Schmoll.' In 1802 his father proceeded with him on a musical tour to Leipzig, Hamburg, and Holstein, and afterwards he went to Vienna. There he spent nearly two years in the study of the great masters. He next accepted the situation of music-director at Breslau, where he retouched several of his earlier works, and composed the opera of 'Rübezahl,' which afterwards appeared as the composition of Professor Rode. In 1806 Prince Eugene of Würtem-

berg invited Weber to Carlsruhe, where he produced two symphonies, several concertos, &c., but the war obliged him to move. He resided for some time in the house of the Duke Louis of Würtemberg at Stuttgard, and completed his opera of 'Sylvana,' or rather remodelled it on his former work, 'Das Waldmädchen.'

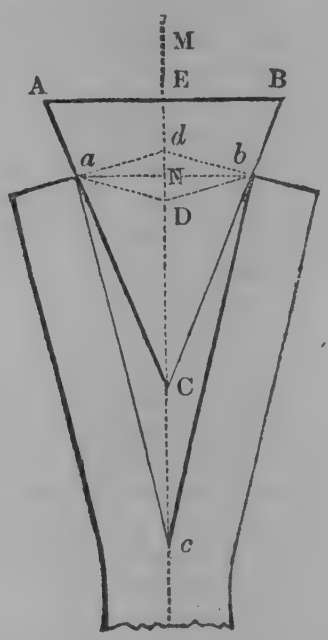
In 1810 Weber set out on another professional journey in Germany. At Darmstadt, in 1810, he composed 'Abou Hassan.' From 1813 to 1816 he directed the opera at Prague, after having reorganised that establishment. Subsequently he accepted an engagement to found a German opera at Dresden, and this appointment, which he held till his decease, absorbed, during the first two years, nearly the whole of his attention. In 1822 he brought out, at Berlin, his greatest work, 'Der Freischütz.' Not only the novelty and beauty of the music, but the deep thought it evinced, excited an extraordinary sensation in the north of Germany, and subsequently in London, where it was first performed July 23, 1824.

In Nov., 1823, Weber produced at Vienna his 'Euryanthe.' In 1825 he received a visit at Dresden from Mr. C. Kemble, for the purpose of offering him 500*l.* to compose an opera for the English stage, an engagement which he willingly undertook. Mr. Planché provided the drama, which was entitled 'Oberon, or the Elf-King's Oath,' and founded on Wieland's celebrated poem. It was brought out at Covent Garden, April 12, 1826, with Weber himself as conductor. He was greeted in the most cordial manner by the audience, and thoroughly satisfied with the success of his work. But his visit to London in an unfavourable season aggravated a disorder which proved to be pulmonary, and he sank rapidly. He had a benefit concert at the Argyll Rooms, but on that occasion he had scarcely strength to go through his business as conductor. On June 5, 1826, he was found lifeless in his bed. He was buried in the Roman Catholic Chapel, Moorfields, permission to inter him in St. Paul's Cathedral having been refused on account of his religion.

WEBSTER, JOHN, has left few authentic records of his career, beyond his works. The earliest notice we find of him is in the papers of Henslowe, where he is mentioned as writing plays in conjunction with Dekker, Drayton, Middleton, Munday, Chettle, Heywood, and Wentworth Smith. The first work of his own which he published was 'The White Devil.' This was printed in 1612. In 1623 was published his other great play, 'The Duchess of Malfi.' 'Appius and Virginia' was printed in 1654. These are the works upon which the fame of Webster is principally built. The works of Webster were collected and edited by Mr. Dyce, in 1830.

WEBSTER, NOAH, LL.D., was born at West Hartford, in Connecticut, U. S., on the 16th of October, 1758. He entered Yale College in 1774, but in 1777 he was withdrawn for a time from his studies by joining the military service under the command of his father. Notwithstanding this interruption he took his degree with distinction the following year. He was called to the bar in 1781; but, instead of following the profession of the law, he engaged in that of a teacher. His 'First Part of a Grammatical Institute of the English Grammar,' published at Hartford in 1783, was the first of a number of elementary works, all of which were well received. He also took a leading part in the discussion of the political questions of the time, both by his 'Sketches of American Policy,' published in 1784, and his other writings in support of the principles of federalism, and by the establishment in 1793 of a daily paper in New York. In 1798 he removed to Newhaven, where he spent the remainder of his life. His great work, his 'New and Complete Dictionary of the English language,' was begun in 1807, and the first edition was published in 1828. This work, which has been since several times reprinted, is a performance of great labour and care. The etymological part is more ingenious and showy than really learned or profound. Dr. Webster died at Newhaven, May 27, 1843.

WEDGE, in Mechanics, is a prism of wood or metal whose base is a triangle: it is employed to remove two objects from one another laterally, or to rend asunder the parts of a body; an edge which is parallel to the geometrical axis of the prism being introduced between the objects, or parts of the body, and the whole wedge being then driven forward by a percussive force, as the stroke of a hammer.



Let ABC represent the section of a wedge perpendicularly to the mathematical axis; and for simplicity, suppose this section to be an isosceles triangle. The plane passing through AB, perpendicular to ABC and to the paper, is called the head or back of the wedge: the planes passing through AC and BC perpendicular to the paper are called the sides; and their line of section, passing through C, is called the edge.

The motive power, supposed to be represented by some weight, is applied to the head of the wedge; and may be supposed to act in the direction MC perpendicularly to that plane, and passing through C in the edge. Let the material which is to be rent asunder be in contact with the sides of the wedge in lines passing through *a* and *b* perpendicularly to the paper; and let the two

parts yield as if they were capable of turning about some point c in the direction of MC, produced if necessary: then it is evident that the effect of the wedge will be the same as if a section of the latter, perpendicularly to the axis, were abc. Imagine ad, bd to be drawn perpendicularly to ac and bc; then those lines will meet at a certain point, as d, in the line MC: imagine also the parallelogram adbD of forces to be constructed; then dD or $2d$N will represent the motive force, and da or db the pressure which that force exerts at a or b perpendicularly to ac and bc. Let P represent the motive force, and R the pressure at a or b; then, in a state of equilibrium, the latter will represent the reaction of the material in the direction ad or bd; and we have,

$$P : R :: 2dN : da.$$

But the triangle aNd is similar to cNa; therefore

$$dN : da :: aN : ac,$$

and consequently $P : R :: 2aN (=ab) : ac$.

If c were supposed to coincide with C, we should have

$$P : R :: 2aN : aC;$$

or by similar triangles abC, ABC,

$$P : R :: AB : AC.$$

If the force of the wedge at the points a or b were to be estimated in the direction Na or Nb; as when it is required, neglecting friction, to find the force with which a given pressure, P, in the direction MC, on the head of the wedge, would make a body at a or b slide in a direction perpendicular to MC: then, R′ representing that force, and c coinciding with C, or ad being now now perpendicular to AC, we should have

$$P : R' :: 2dN : Na, \text{ or as } 2aN \text{ to NC,}$$
$$\text{or as AB to EC.}$$

WEDGWOOD, JOSIAH, was born July 12, 1730, at Burslem, in Staffordshire, where his father, Thomas Wedgwood, and some other members of his family, were engaged in the manufacture of pottery, a branch of industry then in a very imperfect state. His education was very limited; and at the age of eleven years Josiah worked in his elder brother's pottery. The small-pox, which left an incurable lameness in his right leg, so as afterwards to require amputation, compelled him to relinquish the potter's wheel. After a time he left Burslem, and entered into partnership with a person named Harrison, at Stoke; and during this partnership his talent for the production of ornamental pottery is said to have first developed itself. He returned to Burslem in 1759, and set up for himself. His business being prosperous, he took a second manufactory, where he made white stone-ware, and a third, at which was produced the improved cream-coloured ware by which he gained so much celebrity. [EARTHENWARE.] Wedgwood presented some articles to Queen Charlotte, who ordered a complete table service, and appointed him her potter. He soon afterwards opened a warehouse in the metropolis for the sale of his productions. One of his principal works was his imitation of the Portland Vase, of which he made fifty copies. But though these were sold for fifty guineas each, that sum did not, it is said, repay him for his expenditure. He succeeded in producing the most delicate cameos, medallions, and miniature pieces of sculpture, in a substance so extremely hard, that they appear likely to exceed even the bronzes of antiquity in durability. Another important discovery made by him was that of painting on vases and similar articles, without the glossy appearance of ordinary painting on porcelain or earthenware; an art which appears to have been lost since the time of Pliny. The fame of his operations was such that his works at Burslem, and subsequently at Etruria, a village erected by him near Newcastle-under-Lyne, and to which he entirely removed in 1771, became a point of attraction to numerous visitors from all parts of Europe. The result of Wedgwood's talent and energy not only obtained for him extensive patronage and an ample fortune, but were of the highest importance to the commercial interests of his country.

In addition to the attention bestowed by Wedgwood upon this manufacture, he deserves remembrance for the public spirit displayed by him in the encouragement of various useful schemes. Among these the Trent and Mersey Canal is conspicuous. Wedgwood's pyrometer is noticed elsewhere. [PYROMETER.] He was a fellow of both the Royal Society and the Society of Antiquaries, and contributed some papers to the 'Philosophical Transactions.' He died at Etruria, Jan. 3, 1795.

WEDNESBURY. [STAFFORDSHIRE.]

WEDNESDAY. [WEEK.]

WEEDON-BECK. [NORTHAMPTONSHIRE.]

WEEDS. Every plant which grows in a field other than that of which the seed has been sown by the husbandman is a weed, and, inasmuch as it interferes with the intended crop, should be carefully eradicated. It is a proof of good cultivation when few weeds appear amongst the growing crops; and many of the operations of tillage are intended chiefly for their destruction. One of the principal uses of summer fallows is to destroy the weeds, which come up in spring, and which would shed their seeds in summer, if they were not destroyed before the seeds ripen. When roots are sown in drills and carefully hoed, they produce the same cleansing effect, and supersede the fallow: but in heavy loams which have been neglected and overrun with weeds, a clean fallow is sometimes indispensable, before any improved method can be adopted. When a farmer enters on lands which are in a foul state, it is the cheapest way in the end to sacrifice a crop, and thoroughly purge his fields from weeds, especially those which have vivacious roots, and cannot be extirpated by simple ploughing. The mode of doing this must depend on the nature and duration of the weeds, whether their roots are perennial or die off after the plant has borne seed. Annual weeds are most readily extirpated by repeated harrowings, by which the seeds are brought within the influence of the atmosphere, and when they have fairly vegetated may be buried or rooted out, and by exposing their roots to the influence of a hot sun, they are effectually destroyed. The seeds of

annual weeds are chiefly brought on the land in the manure which is made in the yards, where the cattle fed on hay or straw swallow the seeds, which pass through them undigested. By exciting a great degree of fermentation in the mixture of dung and litter, some of the seeds may be destroyed, but many of them will keep their vegetative powers even after having been exposed to a considerable heat: and, as it is not advisable to let the manure undergo a great degree of decomposition before it is carried on the land, many seeds always escape destruction, and vegetate as soon as they are placed in a favourable situation. Those which are buried deep lie dormant for a long time, and vegetate as soon as the plough brings them up again.

The experienced farmer knows well what peculiar species of weeds infest his fields, according to the soil and situation; and by studying their habits, time of flowering, and of ripening their seed, he learns the best mode of destroying them.

WEEK. This well-known period of seven days, now universally adopted over the Christian and Mohammedan world, is the most obvious and convenient division of the lunar month; and it is also, more nearly than any other short term would be, an aliquot part of the solar year of 365 days.

Dion Cassius attributes the invention of the week to the Egyptians, from whom he seems to say it was borrowed in later times by the Greeks and other nations ('Hist. Rom.,' xxxvii. 18, 19, and the note in Reimar's edition). The week was unknown to the Greeks of the classical ages, and also to the Romans, till it was gradually adopted, along with Christianity, under the later emperors.

The curious passage we have referred to in Dion Cassius is the source of all that is known as to the origin of the names that have been given to the days of the week. The Ptolemaic arrangement of the heavenly bodies according to their distances from the earth is in this order:—Saturn, Jupiter, Mars, the Sun, Venus, Mercury, the Moon (Saturn being the most distant); and it was a principle of the ancient astrology that these planets presided in this succession over the hours of the day. Upon this notion, if the first hour be assigned to Saturn, it will be found that the 25th (or first hour of the second day) will fall to the Sun; the 49th (or first of the third day) to the Moon; the 73rd (or first of the fourth day) to Mars; the 97th (or first of the fifth day) to Mercury; the 121st (or first of the sixth day) to Jupiter; and the 145th (or first of the seventh day) to Venus. *Dies Saturni* (the day of Saturn), *Dies Solis* (the day of the Sun), &c., are accordingly the Latin designations that have been given to the days of the week; and from these have been formed the modern names used in different countries, either by literal translation (in the Italian, Spanish, French, and other languages of the Latin stock), or, in the Teutonic tongues, by the substitution, in some cases, of the corresponding deity of northern paganism for the classical god. Thus the deity of the Old Saxons most resembling Mars being held to be Tiu, the day of Mars was called by them, after their conversion to Christianity, Tiues Daeg, whence our Tuesday. For a similar reason the day of Mercury received the name of Wodnes Daeg (that is, Woden's Day), whence our Wednesday; the day of Jupiter, Thunres Daeg, or Thor's Day, whence our Thursday; and the day of Venus, Frige Daeg, or Friga's Day, whence our Friday.

WEENINX, JAN BAPTIST, called 'the Old,' was the son of an architect of Amsterdam, where he was born in 1621. He died at Utrecht in 1660. Weeninx painted both large and small subjects, and was remarkably rapid in his execution. Some of his small pictures are highly finished, but his large works have more merit. He was one of the best painters of birds of the Dutch school.

WEENINX, JAN, called 'the Young,' was the son and pupil of Jan Baptist Weeninx, and painted in the same style as his father, whom however he excelled in hunting and sporting pieces, and in colouring. He was born at Amsterdam in 1644, and after spending some years in the service of the elector John William of the Pfalz, he returned to his native place, and died there in 1719. There are many large pictures by him of birds and hunting-scenes in the gallery at Schleissheim near Munich.

WEEVIL, the name popularly applied in England to the beetles which constituted the genus *Curculio* of Linnæus, now the type of a large family of coleopterous insects, distinguished by the prolongation of the head, so as to form a sort of snout or proboscis. The weevils are favourites with the entomologist on account of the singularity and often beauty of their forms and colours. The splendid diamond beetle, the wing-cases of which furnish such gorgeous microscopic objects, is a member of the tribe. Many of them are adorned with the most vivid metallic lustre, and some in intensity and brightness of hue emulate gems. The family includes very numerous genera and species, distributed widely over the world.

The weevils are interesting in another point of view. Many of them are dangerous enemies to the agriculturist, destroying grain, fruit, flowers, leaves, and stems, and from their numbers often perpetrating serious mischief.

WEIGHING-MACHINE, is any contrivance by which the weight of an object may be ascertained. Under the words BALANCE, SPRING-BALANCE, and STEELYARD, the machines by which materials of comparatively small magnitude are weighed are explained. The Weighing-Machine which is usually employed at the toll-gates on roads for the purpose of determining the weights of laden carriages, may be described as a platform sunk on a level with the road, and made to rest at four points on a double lever of the second kind. [LEVER.] The extremities of the arms of these levers rest upon a third lever, which may be of the first or second kind; and this last lever may either serve as a steelyard, or may be connected with one arm of an ordinary balance, or with the extremity of a steelyard.

WEIGHT. [PRESSURE; SPECIFIC GRAVITY.] When weight is to be very accurately taken, since every body is buoyed up to a certain extent by the atmosphere, attention must be paid to the

state of the air at the time of weighing, and to the substance weighed. If an iron weight balance a wooden one in a given state of the atmosphere, for that very reason there cannot be strict equilibrium in any other state of the atmosphere. Wood being at least seven times as bulky as iron, the effect produced on the weight of the wood by the alteration of the state of the air is at least seven times as much as that produced on the iron.

WEIGHT OF THE EARTH. The quantity of matter which the earth contains must ultimately be our only guide to that of any other planet. The relative masses of two planets can be found by calculation of the effects which they produce upon any third body; but the mass of a planet with reference to any given substance, as water, cannot be directly determined in any instance except our own earth. Perhaps a problem could hardly be proposed which would seem more impracticable to the ordinary reader than that of determining the mean density of the earth. It amounts to asking this:—If it were required to substitute for the earth a solid globe of the same size, *but of uniform material*, in such a manner that the absolute weight of bodies on its surface should remain the same, and the attraction of the whole on other planets remain the same—what must the material be?

Of necessity this question was started by Newton, whose system was the first in which it became of much interest. Having no means of submitting it to experiment, he made one of those sagacious guesses, which, had they been collected and preserved, would alone have kept his memory alive. He judged the earth to be between five and six times as massive as the same bulk of water; which is the truth.

The relative masses of two planets are determined by the observation of their effects upon a third. Two preliminaries are required: first, the great assumption of the theory of gravitation, that any two particles of matter must attract one another with forces which at different distances are directly as their masses, and inversely as the squares of those distances; secondly, the mechanical consequence of this law of action, namely, that two spheres, having their centres at any given distance, attract one another in the same manner as if each were collected in its centre.

In the case before us the earth itself is made one of the planets. Some known substance, a mountain or a ball of lead, is made the other planet. The attracted body is not a planet, but a pendulum or a plumb-line, and the effect of the mountain or ball of lead upon the plumb-line is measured, that of the earth being either measured or previously known. The actual attraction of the mountain or ball of lead being thus determined, its effect as it would be if placed at the centre of the earth can be calculated; which effect is to the effect of the earth as the mass of the mountain or ball of lead to that of the whole earth. The result of this process, as usual, is condensed into a formula, in which the mode of making the steps is lost sight of: but the above is not the less the manner in which the experiment must be explained. The result of the experiments of Maskelyne, Cavendish, and Baily, is, that th mean density of the earth is 5.6604 that of wate This mean density of $5\frac{2}{3}$ is very much greater tha that of the substances which abound at the surface All common rocks are under 3, and nothing unde the ores of the heavier metals comes up to $5\frac{2}{3}$ The earth is as massive as if it were all compose of silver-ore, from the centre to the circumference so that there must be an increase of densit towards the centre; and it is therefore to be pre sumed that the earth is solid to the centre, an not, as many have imagined, a hollow shell.

WEIGHTS and MEASURES. The origi and history of the different weights is alluded t in AVOIRDUPOIS and TROY; of the standards o length in STANDARD, in which last article will b found an account of the transition to the nov established *imperial measures*. The day is pro bably distant when the English public shall enjo the advantages of a uniform decimal system o weights and measures—the only one which is sur of stability. An opinion is gaining ground tha the best method of ultimately attaining this end i by beginning with the coinage. The introductio of coins of two shillings each, followed by that o coins of twopence-halfpenny each, might be mad without requiring any alteration in the habits o calculations of any one. The first step to this sys tem was taken in 1850 by the issue of the florin.

We now describe the English weights an measures as they stood on the last day of th year 1825, immediately before the introduction b law of the imperial measures.

Troy Weight.—See TROY WEIGHT. The tro pound is 5760 grains. There is but one grai in use, whether troy or averdupois, and a cubi inch of pure water is 252.458 grains (baro meter 30 inches, thermometer 62° Fahr.). Gol and silver are measured by this weight. I is usual to say that precious stones are als measured by troy weight; but, as may be sup posed, the measure of these is the grain. Th diamond is measured by carats of $151\frac{1}{2}$ to th ounce troy; so that the carat is $3\frac{1}{6}$ grains ver nearly. For pearls the old foil measure stil exists; in which the pound is less than the tro pound by its fifth part, and the grain is one-fift less than the troy grain. In the 17th centur the goldsmiths divided the ounce troy into 2 carats of four grains each for gold and silver: s that the pound troy contained 1152 gold-cara grains. They also divided the ounce into 15 carats of four grains each, for diamonds: so th pound troy contained 7200 diamond-carat grains But now the CARAT has only the sense note under that word, for gold and silver; and i altered as above for diamonds.

Apothecaries' Weight.—In dispensing medi cines, the pound troy is divided into 12 ounces the ounce into 8 drams, the dram into 3 scruples consequently each scruple is 20 grains. But i buying and selling medicines wholesale, aver dupois weight is and always has been used.

Apothecaries' fluid measure.—Sixty minim make a fluid dram; 8 fluid drams a fluid ounce 20 fluid ounces a pint. The minim of water is a nearly as possible the natural drop; but not o

other substances, the drops of which vary with their several tenacities. In the imperial system a pint of pure water weighs a pound and a quarter.

Averdupois weight.—The pound is 16 ounces, and the ounce 16 drams: the modern pound is 7000 grains (the same as the troy grains). The hundredweight is 112 pounds, and the ton 20 hundredweights. The stone is 14 pounds. The ton of shipping is not a weight, but a measure, 42 cubic feet, holding 24 hundredweight of sea-water.

Long Measure.—Three barleycorns make an inch, 12 inches a foot, 3 feet a yard, 5½ yards a pole or perch, 40 poles a furlong, 8 furlongs (1760 yards) a mile. Also 2¼ inches are a nail, 3 quarters of a yard a Flemish ell, 5 quarters an English ell, 6 quarters a French ell. A pace is 2 steps, or 5 feet; a fathom is 6 feet. The chain is 22 yards, or 100 links; 10 chains make a furlong, and 80 chains a mile. The barleycorn is now disused, and the inch is sometimes divided into 12 lines (as in France), but oftener into tenths or eighths. On our older itinerary measures, see League and Mile. The hand, used in measuring the height of horses, is fixed at 4 inches by 27 Henry VIII., cap. 6.

Square Measure.—A square perch is 30¼ square yards; 40 square perches are a rood; 4 roods an acre. The acre is also 10 square chains, or 4840 square yards. Rood is the same as rod.

The cubic measures, or measures of capacity, do not immediately depend upon the cubic foot, except in the case of timber. Forty cubic feet of rough timber, or 50 feet of hewn timber, make a load.

The preceding measures have been untouched by the act which introduced the imperial measures. The old measures of capacity, the wine measure, ale and beer measure, and the dry measure, are now replaced by the imperial measure.

Imperial Measure.—This measure supersedes the old corn, wine, and beer measures. The gallon contains 277.274 cubic inches, and is 10 pounds averdupois of water. Four gills are a pint, 2 pints a quart, 4 quarts a gallon, 2 gallons a peck, 4 pecks a bushel, 8 bushels a quarter, 5 quarters a load. The common dry bushel was called the *Winchester bushel;* this name is a remnant of the laws of King Edgar, who ordained that specimens kept at Winchester should be legal standards.

Wool Measure.—Seven pounds make a clove, 2 cloves a stone, 2 stone a tod, 6½ tods a wey, 2 weys a sack, 12 sacks a last.

The old Scotch standard foot was 12.0194 English inches, and the mile was 1976½ yards. The Scotch liquid gallon was 833.6272 English cubic inches. Four gills made a mutchkin, 2 mutchkins a chopin, 2 chopins a pint, and 8 pints a gallon. The *Irish* malt gallon was 272¼ cubic inches, and the liquid gallon 217.6 cubic inches. The Irish pole was 7 yards, which made the mile equal to an English mile and three-elevenths, and the acre greater than the English acre in the proportion of 196 to 121.

French Measures.—In the ancient French system the *pied de Roi* was 12.7892 English inches, the aune (at Paris) 46.85 of the same. The toise was 6 feet. For the itinerary measures see Mile. The *arpent d'ordonnance* was 1 acre, 1 rood, 2 perches (English); the *arpent commun* 1 acre 7 perches; the *arpent de Paris* 3 roods 15 perches English. The *acre de Normandie* was 2 acres 2 perches English. For measuring liquids, the pinte was less than the English quart by its 61st part. Two boissons made a demisetier, 2 demisetiers a chopine, 2 chopines a pinte, 2 pintes a quarte, 4 quartes a setier, 36 setiers a muid (70.8 English gallons). For grain 16 litrons made a boisseau, 3 boisseaux a minot, 2 minots a mine, 2 mines a setier, 12 setiers a muid. The minot was 1.108 of the English bushel. The principal weight, called *poids de marc,* was the livre of 9216 French grains, or 7555 English grains; 72 grains made one gros, 8 gros an ounce, 8 ounces a marc, 2 marcs a livre.

The new system is called *metrical,* as derived from the measurement of the earth. Its first measure, the metre, is presumed to be the ten-millionth part of a line drawn from the pole to the equator, and is 39.37079 English inches. All the multiples and subdivisions of every measure are decimal, and are formed by the same prefixes. For 10, 100, 1000, and 10,000, the syllables *Deca, Hecto, Kilo,* and *Myria* are prefixed; and for tenths, hundredths, thousandths, the syllables *Deci, Centi, Milli.* Latin prefixes indicate division, Greek prefixes multiplication. Thus the hectometre is 100 metres, and the centimetre the hundredth part of a metre. The metre being thus settled, the other fundamental measures are formed as follows:—

For surface or area, the *Are,* which is a decametre square, or 100 square metres, or .02471143 of an English acre, or 3.9538 English perches.

For solidity, the *stere,* or cubic metre, 35.32 cubic feet English, or 220.09687 imperial gallons English.

For liquid measures the *litre,* or cubic decimetre, .22009687 of an imperial gallon, or a very little more than a pint and three-quarters English.

For weight the *gramme,* a cubic centimetre of distilled water at the freezing-point, .00220606 of an English pound averdupois, or 15.442 grains English. The kilogramme is therefore 2.2 pounds averdupois, or, roughly, 50 kilogrammes make a hundredweight. The franc, the unit of money, is divided into 10 decimes, and each decime into 10 centimes. The sous is therefore 5 centimes.

In what follows of this article, the weights, &c., named have been taken from Kelly's 'Cambist.' All the English measures are imperial, and each measure is given in English measures.

Austria. The metrical system is introduced in the Italian dominions. In Austria proper gold and silver are weighed by the Vienna marc of 4333 grains. The pfund is 1.235 lb. averdupois: the metzen is 1.691 of the English bushel. The eimer is 12.444 gallons. The foot is 12.45 inches; the ell, 30.66 inches. The joch is 1 acre, 1 rood, 28 perches.

Bavaria. The Augsburg marc is 3643 grains; 24 lb. commercial weight is 25 lb. averdupois, and 24 lb. carriers' weight is 26 lb. averdupois,

nearly. The metzen is 1.515 of the English bushel; the fuder is 31.24 bushels. The foot (half the short ell) is 11.667 inches. The long ell is 24 inches. The German geographical mile is 4.6 miles English.

Belgium. The French metrical system.

Constantinople. The chequee is 4957 grains. The oke is 2.832 pounds averdupois. The killow (dry) is 7.296 gallons. The almud is 1.150 of the English gallon. The pike is 27 inches. The measures of Turkey are very imperfectly known.

Denmark. The pound for gold and silver is 7266 grains. The commercial pound is 1.1028 lb. averdupois. The barrel is 3.8264 bushels. The viertel is 1.701 of the English gallon. The foot, or half-ell, is the Rhineland foot of 12.356 English inches. The toende of corn is 5½ acres.

Florence and Leghorn. The cantaro is 150 pounds of .74864 lb. averdupois each. The stajo is .6702 of the English bushel. The barile is 10.033 gallons. The braccio is 22.98 English inches. The saccata is 1 acre 36 perches.

Frankfort. For gold and silver the Cologne marc. The common pound is 1.03 lb. averdupois. The centner is 112.25 lb. averdupois. The malter is 2.9705 bushels. The ohm is 32.454 gallons. The foot is 11.27 inches, the ell 21.24 inches.

Genoa. The pound sottile for gold and silver is 4891.5 grains. The pound *grosso* is .76875 lb. averdupois. The mina is 3.321 bushels. The mezzarola is 32.57 gallons. The palma is 9.725 inches.

Hamburg. The Cologne marc is 3608 grains; the pound troy is two marcs. The commercial pound is 1.068 lb. averdupois. The last of wheat (30 scheffels) is 10.9 quarters; the ahm is 31.85 gallons. The foot is 11.289 inches. The scheffel of land is 1 acre 6 perches.

Holland. The marc is 3798 grains; the pound is 2 marcs. But the commercial pound is 1.0893 lb. averdupois. The last (variously divided) is 10.231 quarters. The aam (256 pints) is 34.16 gallons. The Rhineland foot is 12.36 inches. There are several ells of about 27 inches. The Rhineland perch is 12 Rhineland feet, and the Rhineland morgen or acre is 2 acres 16 perches.

Lübeck. For gold and silver, as at Hamburg. The commercial pound is 1.0685 lb. averdupois. The scheffel is .92 of the English bushel. The ahm is 31.85 gallons. The foot or half-ell is 11.346 inches.

Malta. The pound for gold and silver is 4886 grains. The commercial pound is 1.745 lb. averdupois. The salma is 7.968 bushels. The foot is 11.167 inches. The canna (8 palmi) is 81.9 inches.

Milan. The mark is 3627 grains. The pound *sottile* is .7206 lb. averdupois; the pound *grosso* is 1.682 lb. averdupois. The moggio (32 quartari) is 4.0234 bushels. The brenta (12 quartari) is 15.71 gallons. The braccio is 23.42 inches. The metrical system is also introduced.

Naples. The pound for gold and silver is 4950 grains. The cantaro grosso is 196.5 pounds averdupois, the cantaro piccolo 106 pounds averdupois. The tomolo is 1.407 of the English bushel. The barile is 9.172 gallons. The palmo is 10.38 inches. The moggia is 3 roods 12 perches.

Netherlands. The French metrical system.

Portugal. The marc is 3541.5 grains. The commercial pound is 1.0119 lb. averdupois. The moyo is 22.39 bushels. The almude is 3.6407 gallons. The foot is 12.944 inches.

Prussia. The Cologne marc is 3609 grains; 2 marcs are a commercial pound, or 1.0311 lb. averdupois. The scheffel is 1.5116 of the English bushel. The eimer is 15.11 gallons. The foot is 12.356 inches, the ell two-thirds of a metre. The morgen or acre is 2 roods 21 perches.

Rome. The pound is 5234 grains or .7477 lb. averdupois. The rubbio (4 quarte) is 8.1012 bushels. The barile (32 boccali) is 12.841 gallons. The foot is 11.72 inches. The builders' canna, of 10 palms, is 87.96 inches.

Russia. There is but one pound, .9026 lb. averdupois. The pood is 36 lb. averdupois. The chertwert is 5.7698 bushels. The vedro is 2.7048 gallons. The inch is the English one; the arshine is 28 inches; the foot is 13¾ inches; but the English foot is in common use. The Russian verst, or werst, is 0.664 (or nearly three-quarters) of an English mile. The dessetina is 2 acres, 2 roods, 32 perches.

Sardinia has, we believe, lately adopted the French metrical system.

Saxony. For gold and silver the Cologne marc. The commercial pound is 1.0294 lb. averdupois. The Dresden wispel (24 scheffels) is 69.85 bushels; the Leipzic wispel, 91.747 bushels. The Dresden eimer is 14.89 gallons; the Leipzic eimer 16.75 gallons. The Dresden foot is 11.14 inches; the Leipzig foot is 11.13 inches. The acre is 1 acre, 1 rood, 18 perches.

Sicily. The pound is 7 pounds averdupois. The cantaro grosso is 192.5 pounds averdupois; the cantaro sottile is 175 lb. averdupois. The salma grossa is 9.46 bushels; the salma generale 7.59 bushels. The salma of wine is 19.23 litres. The palmo is 9.5 inches.

Smyrna. The chequee is 4958 grains. The rottolo is 1.2748 lb. averdupois. The killow is 11.3 gallons. The pike is 27 inches.

Spain. The Castilian marc for gold and silver is 4800 grains. The commercial pound is 1.0144 lb. averdupois. The fanega is 1.55 of the English bushel. The arroba of wine is 3.538 gallons. The foot is 11.128 inches; the vara is 33.384 inches. The fanegada (for corn-land) is 1 acre, 21 perches.

Sweden. The Mint marc is 3252 grains. The commercial pound is .9376 lb. averdupois. The dry tunna is 4.028 bushels; the liquid tunna is 48 kanns of .5756 of the English gallon each. The foot, or half-ell, is 11.684 inches. The tunneland is 1 acre, 35 perches.

Switzerland adopted the French metrical system by a law passed in 1849.

United States. The weights and measures are those of England before the late alterations.

Ancient Weights and Measures.—The *Romans* divided the as or libra, or any other unit, into twelve unciæ, so that the uncia became little more than a name for the twelfth part. The libra of weight was thus subdivided: — 3 siliquæ, one obolus; 2 oboli, one scrupulum; 4

scrupula, one sextula; 6 scrupula, one sicilicus; 8 scrupula, one duella; 3 duellæ, one uncia; 12 unciæ, one libra. The Roman *libra*, or pound-weight, is about .71 of the English averdupois pound.

In the measures of length the pes, or foot, was divided not only into 12 unciæ, but also into 16 digiti. And 4 digiti are one palmus; 4 palmi, one pes; one pes and a half, one cubitus; $2\frac{1}{2}$ pedes, one gradus; 2 gradus, or 5 pedes, one passus; 1000 passus, one milliare or mile. The Roman foot was 11.62 English inches.

The *jugerum* was an area of which the scrupulum (or 288th part) was the square decempeda, or 100 square feet. The *aripennis* (whence *arpent*) was a Gallic measure which Columella defines as semi-jugerum, but whether of Romans or Gauls is not clear.

The *amphora*, or *quadrantal*, for liquid measure, was a cubic foot, and contained about 5.6586 imperial gallons; the congius was the 8th part of the amphora.

The *modius*, or *modium*, of dry measure, was 16 sextarii, or the third part of the amphora or cubic foot.

Of the *Greek weights and measures*, which have been partly discussed in the articles TALENT and STADIUM, we can only mention that the Greek foot is longer than the Roman by the 24th part of the latter; that the parasang (originally a Persian word) is 30 stadia; that the *plethron* was 100 feet, and in square measure it was a square whose side was 100 feet in length, or 10,000 square feet; that the *metretes* in liquid measure, is said to have been an amphora and a half; and that in dry measures the *medimnus*, of which the *chœnix* was the 48th part, was two Roman amphoræ.

For Hebrew weights, see SHEKEL.

WEIMAR, the capital of Saxe-Weimar-Eisenach, is situated in 51° N. lat., 11° 20′ E. long., on the left bank of the Ilm, 55 miles by railway S.W. from Leipzig, and has 14,000 inhabitants. It stands in a pleasant valley, with a wooded mountain to the north and low hills to the south and east. The river, over which there are two bridges, winds along the south side of the town. Weimar is an open town with irregular streets; there are however many agreeable houses, but the general appearance is plain and rather antique. The palace of the Grand-Duke is beautifully situated, and the interior is fitted up with great elegance and taste. The adjoining park would be an ornament to any great city. The chief public buildings are—the workhouse, the hospital, the library, the mews, and the two churches, but none of them is at all distinguished by architecture. The Court Theatre was built in 1825, and was for some time under the management of Göthe and Schiller. The grand-ducal library contains above 130,000 volumes, besides manuscripts, copper-plates, and drawings. The principal church deserves notice, as containing the sepulchres of the reigning family, and being adorned with several fine paintings by Lucas Cranach. The house of Göthe in the Frauenplatz, and that of Schiller on the Esplanade are shown to the public. Weimar has a much-frequented gymnasium, a seminary for schoolmasters, an academy for drawing, painting, and sculpture, a house of correction, and an orphan asylum. Falk's establishment for destitute children was converted, in 1829, into a public school, by the name of Falk's Institution. There are some manufactures, but they are of small importance: the inhabitants derive their chief support from the residence of the court. The chief articles of commerce are—woollen cloth, linen, leather, room paper, books, maps, &c.

WEINMA'NNIA, a genus of plants belonging to the natural order *Cunoniaceæ*. The species are trees, and natives of South America and the Mauritius. There are about 40 species of this genus described.

WEIR, or WEAR, is a dam erected across a river, either for the purpose of taking fish, of conveying a stream to a mill, or of maintaining the water at the level required for the navigation of it.

It appears that no weirs can be maintained on any rivers to the prejudice of the public, or even of individuals, except such as have existed time out of mind, or such as have been erected under local acts of parliament for the navigation of particular rivers.

The provision of the Roman law as to the maintenance of public rivers (flumina publica) against any impediment to navigation, or against any act by which the course of the water is changed, are contained in the 'Digest' (43, tit. 12, 13).

WEISSEMBOURG. [RHIN, BAS.]

WEISSENFELS. [MERSEBURG.]

WELLAND. [LINCOLNSHIRE.]

WELLAND CANAL. [CANADA.]

WELLESLEY, RICHARD COLLEY, MARQUESS WELLESLEY, the eldest child of Garrett, first Earl of Mornington, was born in Grafton Street, Dublin, June 20, 1760. He was sent at an early age to Eton. Both at Eton and the university he stood high for classical attainments. After attaining his majority, his father having died in 1781, he took his seat in the Irish House of Lords, and continued a member of that body till the Union. He was then returned a member of the British House of Commons by the borough of Beeralston. At the next general election the Earl of Mornington was returned for Windsor, and sworn in a member of the Irish privy council. He was soon after appointed one of the lords of the treasury, and in 1793 he was sworn in a member of the British privy council. He had meantime made such progress in the favour of the king and the confidence of the minister, that he was nominated to succeed Lord Cornwallis in the government of British India. He was raised at this time to the British peerage by the title of Baron Mornington. The marquisate which he subsequently received was an Irish peerage.

Lord Mornington reached the Ganges in May, 1798, and in 1799 was created Marquess Wellesley.

The governor-generalship of the Marquess Wellesley was an eventful one. After the defeat and death of Tippoo Saib [TIPPOO SAIB], the next efforts of the governor-general were directed to the extension of the commercial intercourse of India, and to the commencement of those im-

portant financial reforms which eventually raised the revenue of the Company from seven millions to upwards of fifteen millions annually. In 1801 he was again involved in warlike operations. He in that year despatched a force up the Red Sea to assist in wresting Egypt from the power of France. He next turned the British arms against the Mahrattas, conquered the whole country between the Jumna and the Ganges, and compelled Scindia and the Rajah of Berar to make peace. Sir Arthur Wellesley's victory of Assaye, and the crowning battle of Lassawaree, terminated the war. Lord Wellesley, who had been long desirous of returning to Europe, was at last allowed, in 1805, to resign his government, and he embarked in August. He was well received by the government and the East India Company; but complaints were raised that he had been guilty of oppression towards the native powers, especially the Nabob of Oude, and articles of impeachment were presented against him (without effect) in the House of Commons by Mr. Paull.

He now again took part in the proceedings of parliament. He had no great sympathy with the opposition, but he was far from being a strenuous supporter of Mr. Perceval's government, or even, at a subsequent period, of Lord Liverpool's. In 1807 Lord Wellesley declined to become a secretary of state in the Duke of Portland's cabinet. In 1808 he rendered ministers efficient service by his vindication of the expedition to Copenhagen. He was soon afterwards appointed ambassador to Spain. On the death of the Duke of Portland he was recalled, and accepted the appointment of secretary of state for foreign affairs with Mr. Perceval. He held this office from Dec., 1809, till Jan., 1812.

After the assassination of Mr. Perceval, in May, 1812, Lord Wellesley undertook to form a coalition government; but he soon found that the undertaking was hopeless, and resigned his charge. On July 1, when Lord Liverpool had announced himself at the head of the ministry, Lord Wellesley brought forward a motion favourable to Roman Catholic claims in the House of Peers, similar to that which Mr. Canning had carried a few days earlier in the House of Commons. It was lost by only one vote, and that vote a proxy. He continued for ten years from this time to offer a modified opposition to government. In Dec., 1821, he accepted the appointment of lord-lieutenant of Ireland, which he continued to hold till March, 1828. His arrival was the signal for an outburst of the fiercest party spirit. The Orangemen of Dublin insulted the lord-lieutenant in the theatre; the southern counties became the scene of insurrectionary movements; and it became necessary to have recourse to an Insurrection Act and other coercive measures. The Earl of Liverpool's retirement had no effect upon the position of Lord Wellesley, for both Mr. Canning and Lord Goderich were favourable to the Roman Catholic claims. But the first declaration of the Duke of Wellington upon the subject left the lord-lieutenant no alternative but to resign.

In 1831 he was appointed lord-steward under Earl Grey. In Sept., 1833, he resigned that office, and was once more appointed lord-lieutenant of Ireland. On Sir Robert Peel's brief accession to office (1834–5) the Marquess resigned, though urged by his brother to remain. He accepted the office of lord-chamberlain on the formation of the second Melbourne ministry, in April, 1835, but resigned it in the course of the same year. He died at Kingston-House, Brompton, Sept. 26, 1842.

Some Latin poems by him were published early in life. His despatches, &c., while in India and Spain have been published (1836 and 1838) by Mr. Montgomery Martin. Marquess Wellesley also wrote a number of occasional pamphlets.

WELLESLEY PROVINCE. [PENANG, PULO.]

WELLINGBOROUGH. [NORTHAMPTONSHIRE.]

WELLINGTON. [SHROPSHIRE; SOMERSETSHIRE.]

WELLINGTON. [ZEALAND, NEW.]

WELLS. [ARTESIAN WELLS; SPRINGS.]

WELLS, MINERAL. [WATER.]

WELLS, an ancient city and bishop's see united with Bath, a municipal borough, and parliamentary borough, in Somersetshire, 120 miles W.S.W. from London, is situated in a valley at the foot of the Mendip Hills, near the source of the river Ax. The founder of the first church at Wells is said to have been Ina, king of Wessex, in 704. In the reign of Edward the Elder, in the beginning of the 10th century, the town became the seat of a bishopric.

Wells is cleansed, lighted with gas, watched, and supplied with water, under local acts. The city contains a town-hall and a gaol. The cathedral, which is one of the finest structures of the kind in England, forms a striking object as seen from all the great roads leading to the city. It is 371 feet in length, and the transept measures 135 feet. The tower, which is over the junction of the nave and transept, rises to the height of 160 feet; and two other massive towers, each 126 feet in height, crown the extremities of the west front. This façade is remarkable for its tracery and sculptured figures. There are about 150 statues of the size of life, and above 300 others of smaller size; and although many of them are a good deal mutilated, the effect is very striking. The present cathedral was begun in the early part of the reign of Henry III. The central tower was erected at the beginning of the 14th century, and the two western towers were added about the end. The Lady Chapel is by many considered to be the most beautiful specimen of ecclesiastical architecture in England. The cathedral contains several ancient and other remarkable monuments. There are cloisters and a handsome chapter-house. The parish church of St. Cuthbert is a large and handsome edifice in the later pointed style. The Independents, Methodists, and Baptists have places of worship.

The municipal borough is governed by 4 aldermen, of whom one is mayor, and 12 councillors: population, 7050. The parliamentary borough returns 2 members: population, 4607.

WELLS. [NORFOLK.]

WELLS, CHARLES WILLIAM, physician,

was born at Charleston in South Carolina, in May, 1757. His father and mother were natives of Scotland, and emigrated in 1755. He was sent by his father to Dumfries, and afterwards to Edinburgh, for the purpose of being educated, and returned to Carolina in 1771. The revolutionary movements shortly after commenced in America, and his father, who espoused the royalist party, was obliged to fly to Great Britain, where he was followed by his son in 1775. He commenced the study of medicine in Edinburgh, where he graduated in 1780; and he returned to America the same year. At St. Augustine, in East Florida, he conducted, for a time, a newspaper in his brother's name; but, returning to Europe, he commenced practice as a physician in London, in 1785. In 1790 he was appointed physician to the Finsbury Dispensary, and in 1795 was elected assistant-physician to St. Thomas's Hospital, and full physician in 1800.

Dr. Wells was a fellow of the Royal Society, and published in their 'Transactions,' three papers, the principal of which is entitled 'Experiments and Observations on Vision' (1811). In the 2nd and 3rd volumes of the 'Transactions of a Society for the Promotion of Medical and Surgical Knowledge,' he published several papers on various departments of medicine. His contributions to newspapers and magazines were very numerous, embracing politics, general literature, and biography. His last work, and the one on which his reputation as a philosopher must rest, is his 'Essay upon Dew,' which was published in 1814. Too frequent exposure to the night air brought on a disease, of which he died September 18, 1817.

WELSH LANGUAGE and LITERATURE. The Welsh language is that which is now spoken, and has been spoken as far back as historical records extend, in the principality of Wales. The name of 'Welsh' was first given to the people who speak it by the Anglo-Saxons, and the same term or a similar one seems to have been used in many of the Germanic and even of the Slavonic languages to denote the Italians, or other nations whose languages resembled the Latin. 'Welschland' was the name for Italy in German of the middle ages, and is not yet entirely superseded in the language of the common people. The name of that country in Polish is 'Wlochy,' and the appellations of the Walloons and the Wallachians appear to be derived from the same root.

The name which the Welsh give to themselves is 'Cymry,' and to their language 'Cymreig.' The prevalent opinion is that they are a Celtic tribe, and of the same blood and language as the native Irish and the Scottish Highlanders. The Celtic family of languages consists of two distinct branches, the first comprising the Irish, the Gaelic, and the Manks, or language of the Isle of Man, which are in fact merely dialects; and the second, comprising the Welsh, the Armoric or Bas-Breton, and the Cornish. The Welsh and the other languages above mentioned belong to the great Indo-European family of languages, which embraces English, German, Greek, Latin, Sanscrit, and some other languages. The Welsh language in its present state is one of the oldest in Europe; in fact the oldest of the spoken languages. There are Welsh poems in existence, the origin of which is referred with probability to the sixth century of our æra. Generally speaking, the body of poetry which the Welsh possess, from the year 1000 downwards, is intelligible to those who are acquainted with the modern language, after a very slight study. The same observation is perhaps applicable to no other living European language except the Icelandic. Among the bards to whom the oldest specimens of Welsh poetry are attributed, the names of Aneurin, Taliesin, and Myrddin or Merlin, are least strange to English ears.

The best Welsh Grammar is that by Davies, in Latin, first published at London in 1621. It has been frequently reprinted, and has appeared in an English translation. The best Dictionary is that of Owen Pughe, 2 vols. 8vo., London, 1793, of which a new and more convenient edition appeared in 1829. This is only a Welsh and English Dictionary. There is an excellent English-Welsh Dictionary by the Rev. John Walters, of which a new and improved edition appeared about 1825.

The article 'Welsh Language and Literature,' in the 'Penny Cyclopædia,' probably contains more information on this matter than the reader will find anywhere else in the same compass.

WELSH-POOL. [MONTGOMERYSHIRE.]

WELSTED, LEONARD, was born at Abington in Northamptonshire, in 1689, and was educated at Westminster School. Early in life he obtained a situation in the Ordnance Office, which he held till his death in 1747. Welsted's earliest production is supposed to have been a short poem of some humour, called 'The Apple-Pie, a Tale,' which may be read in Nichols's 'Select Collection of Poems,' with notes, iii. 78, though it was originally attributed to Dr. William King, and was published among his collected works in 1789. Other poems by Welsted appeared in 1709, 1710, &c. In 1716 he published 'The Triumvirate, or a Letter in verse from Palæmon to Celia at Bath.' For this he is more than once noticed in the 'Dunciad.' He is also said to have been one of Sir R. Walpole's anonymous writers.

WEM. [SHROPSHIRE.]

WEN, the name of those tumours occurring on the human body which assume the form of a bag or cyst, and hold a variety of contents. These cysts have been named according to the character of their contents. When the contained matter resembles fat or suet, the tumour is called *Steatoma;* when it resembles honey in consistence, *Meliceris;* and when it is like a poultice or pap, it is called *Atheroma*. These however are mere artificial distinctions, and can seldom be satisfactorily applied. These tumours consist essentially of a serous or mucous bag varying in size, and the contents are of an exceedingly varying and sometimes anomalous character. Those which are commonly called wens, and which are mostly situated immediately under the skin, are mostly enlargements of the sebaceous follicles which naturally exist in the skin.

In the treatment of wens two modes may be had recourse to—the one by puncture, the other by removal; but the latter is preferable.

WENDOVER. [Buckinghamshire.]
WENDS. [Slavonians.]
WENER LAKE. [Sweden.]
WENLOCK. [Shropshire.]
WENTWORTH. [Strafford.]
WEOBLY. [Herefordshire.]

WERNER, ABRAHAM GOTTLOB, was born Sept. 25, 1750, at Welslau on the Queiss, in Upper Lausitz. His father was superintendent of a foundry at that place. He received his early education at the school of the orphan asylum at Bunzlau in Silesia, but was afterwards placed at the School of Mines at Freiberg in Saxony. He soon resolved to enter into the mining establishment at that place; and as the regulations required a licentiate's degree in law before admission, he studied jurisprudence for three years at the university of Leipzig. At that university he published, in 1774, a treatise on the external characters of minerals, in which he proposed a methodical and precise language to describe the sensible qualities of mineral substances. By this work, consisting of a few leaves, Werner, says Cuvier, rendered a service to mineralogy analogous to that which Linnæus had rendered to botanical science by the terminology made use of in his 'Philosophia Botanica,' and effected a revolution in the science. In the year following this publication (1775) we find Werner appointed professor of mineralogy in the School of Mines at Freiberg, and inspector of the mineralogical cabinet at that place. He held these offices for 17 years.

In 1780 Werner published a translation of Cronstedt's Mineralogy, with notes, and in the following year a catalogue of the private collection of minerals of Papst d'Ohain. In 1787 he published a little work on the classification of rocks, 'Kurze Klassifikation und Beschreibung der verschiedenen Gebirgsarten.' This was not long afterwards followed by the promulgation of his 'Theory of Formations,' which we are inclined to select as his greatest achievement in the science. His ideas respecting the division of rocks into great classes were not original, but he was the first to observe that the masses or strata that constitute the surface of the globe present themselves in what he termed 'formations,' and that 'the exterior of the earth consists of a series of these formations laid over each other in a certain determinate order.' Unfortunately however he included basaltic and other rocks, now deemed of igneous origin, among his series of constant universal formations; and this part of his theory has been as effectually disproved as the rest has been confirmed.

In Nov., 1791, Werner published his last work, the 'Theory of the Formation of Veins.' In 1792 he was appointed Counsellor (Bergrath) of the mines of Saxony. In 1795 or 1796 he introduced into his lectures the doctrine of a new class of rocks, to which, as lying between the primitive and secondary or flötz, he gave the name of 'transition.' The establishment of the transition class completed Werner's labours, and the promulgation and further illustration of his views now occupied his lectures. He had at this time acquired a great celebrity throughout Europe as the first geologist and mineralogist of the day, and was looked upon as the founder and author of mineralogy as a science. In 1802 he visited Paris, when the Academy of Sciences elected him one of their eight foreign associates.

Werner suffered for many years uninterruptedly from a stomach complaint. The distresses of his country, consequent upon its being made the theatre of the campaign of 1813, seem to have preyed upon his mind, and produced a complication of diseases from which he never rallied. He died June 13, 1817, at Dresden.

WERST, or VERST. [Weights and Measures—*Russia.*]
WERVICK. [Flanders, West.]
WESEL. [Düsseldorf.]

WESER, the ancient *Visurgis*, a river of Germany, formed by the junction of the Werra and the Fulda. The *Werra* rises in the Thüringerwald, a few miles N.E. of the town of Hildburghausen. Its course is generally north-west, past Meiningen, across the principality of Eisenach, the eastern part of the grand duchy of Hesse Cassel, and the Hanoverian province of Göttingen, where it joins the Fulda, after a course of 175 miles, about 100 of which are navigable. The *Fulda* rises on the north-western slope of the Rhöngebirge in Bavaria, drains the greater part of Hesse Cassel, in which it passes the towns of Fulda, Hersfeld, and Cassel, and joins the Werra on the Hanoverian frontier, after a northern course of about 100 miles; its largest feeder on the left bank is the Eder. The Fulda is navigable from Hersfeld. The Werra and the Fulda unite their waters under the walls of Münden, a Hanoverian town between Göttingen and Cassel. From Münden to its mouth in the North Sea, the course of the Weser is winding, but generally N.N.W. It drains the greater part of Hanover, in which it receives the Aller and numerous feeders, and after passing Bremen, forms the boundary between Oldenburg and Hanover. The length of the river from Münden to the sea is 225 miles: its navigation is free, and a uniform toll is fixed for its whole course. The upper and middle portions of the Weser are often rendered impassable in the summer time by the sand banks. Five miles below Bremerlehe a harbour is constructed at the mouth of the river.

WESLEY, REV. JOHN, was the second son of the Rev. Samuel Wesley, of Epworth, Lincolnshire, and was born there June 17, 1703. The eldest son was Samuel, who became an usher in Westminster School. He was sent to the Charter House, London, whence he proceeded to Christ Church, Oxford. The account of his official biographers, Coke and Moore, is, that having taken his degree of B.A., he was elected fellow of Lincoln College in 1724 (Southey says 1726), was ordained by Potter, then bishop of Oxford, afterwards archbishop of Canterbury, in 1725, and graduated as M.A. in 1726.

From his earliest years Wesley had been of a serious temper, and more especially from the commencement of his residence at college religious impressions had taken a strong hold on him. From about the time when he was ordained he began to keep a diary, a practice which he con-

tinued to the end of his life. A large portion of this record, under the title of his 'Journal,' was published by himself, and has been several times reprinted.

Soon after he was ordained he went to officiate as curate to his father at Wroote, and here he resided for about two years; during which time, in 1728, he received priest's orders. It appears to have been in the end of this year that he was summoned back to college, in consequence of a regulation that such of the junior fellows as might be chosen moderators should perform the duties of their office in person. Here he found his younger brother Charles, then an undergraduate of Christ Church, one of a small association of students already distinguished in the university by the derisive appellations of the Holy Club, the Godly Club, the Bible Bigots, the Sacramentarians, and the Methodists. John Wesley immediately joined this society, which now consisted of about fifteen individuals, of whom the most remarkable, besides the two brothers, were James Harvey, the author of the 'Meditations,' and George Whitefield, who shares with Wesley the fame of having been one of the two chief founders of Methodism. [METHODISM.]

It was very soon after this that John Wesley and his brother Charles became acquainted with William Law, the author of the 'Serious Call' and other similar works, whose conversation and writings, harmonising in the main with their own previous notions and feelings, exerted a powerful influence over the two brothers. Meanwhile the less ardent or resolute of their Oxford associates dropped off one by one; and the number, which had at one time been 27, declined at last to 5. A few months after his father's death John Wesley was induced to go out with General Oglethorpe to Georgia, in North America, to preach to the settlers and Indians in the colony which the general was founding there. He and his brother Charles, who now took holy orders, sailed from Gravesend Oct. 14, 1735, in the same vessel with a party of 26 Moravians. They anchored in the river Savannah Feb. 6, 1736.

Charles Wesley returned to England, sent home by Oglethorpe with despatches, early in the next year. John Wesley remained in America till its close. The most remarkable incident of this part of his history is the affair in which he became involved with Miss Sophia Causton, niece of the chief magistrate at Savannah, whose partiality he for some time encouraged, but whom he eventually, by the advice of his Moravian friends, declined to marry. On this disappointment Miss Causton married Mr. Williamson; and soon after Wesley refused to admit her to the communion, upon which her husband indicted him for defamation, laying his damages at a thousand pounds. The affair was never brought to an issue; but it was the occasion of driving Wesley from the colony, which he left Dec. 3, 1737, after a residence of one year and nearly nine months.

He reached England Feb. 1, 1738. While he had been abroad, the religious excitement which now began to be generally known by the name of Methodism had made great progress in London, Bristol, and other parts of the south of England, under the impulse of the enthusiastic preaching of Whitefield, who had sailed from the Downs for Georgia only a few hours before the vessel which brought Wesley back cast anchor there. As soon as he arrived in London Wesley hastened to renew his connection with the Moravians. It was not however till some months after this, that, according to his own account, he for the first time attained to true views of Christianity.

About three weeks after his 'new birth,' June 15, 1731, he set out for Germany to visit the Moravian brethren at their original seat of Herrnhut. He returned to England in September.

Whitefield returned from Georgia in the latter end of 1738; and he and Wesley immediately again became intimately associated. The example of preaching in the open air, first set by Whitefield, Feb. 17, 1739, was shortly after followed by Wesley at the same place, the neighbourhood of Bristol. The first separate meeting-house for the Methodists was begun to be built in the Horse Fair, near St. James's Church, Bristol, May 12, in that year. Lay preaching, of which the first example had been set by an individual named Bowers, in Islington churchyard, after a sermon by Whitefield, was, not without some hesitation, sanctioned by Wesley soon after his return to London in the autumn.

In July, 1740, Wesley solemnly separated himself from the Moravians, with whom he had now come to differ, or had discovered that they differed from him, on some fundamental points of doctrine. From this time Wesley's life was spent in preaching, travelling, writing books, and labouring in all other possible ways for the consolidation and extension of the new church, the management of which was now wholly in his own hands. Not an hour, scarcely even a minute, was abstracted from the service of the cause on which he had set his heart; and rarely has any ambition been so well seconded by the other qualities and habits of mind, and, it may be added, of body too, necessary to sustain it and give it full effect. He rested nowhere, seldom riding less than forty, fifty, or sixty miles a day; even on his journeys from place to place he read and wrote; and he generally preached three or four times, sometimes five times, a day.

About the year 1750, soon after his brother Charles had become a husband, Wesley married Mrs. Vizelle, a widow with four children. The marriage turned out an unhappy one. Wesley, who had stipulated that he should not change his habits with his condition, was little at home. The end was, that after his wife had several times run away from him and been induced to return, she repeated the experiment once more, and was not asked to come back.

Wesley died after a short illness at his house in London, March 2, 1791. His publications are far too numerous for us to attempt any account or even an enumeration of them. Among the most remarkable, besides his Journal, are—a corrected translation of Thomas-à-Kempis, said to have been published by him in 1735, a short time before his departure for America; various collections of

Hymns, most of which however were written by his brother Charles; a History of England; a short Roman History; 'Primitive Physic;' and many short tracts on theological subjects. There are at least two collected editions of his works: one in 32 vols. 8vo., printed immediately after his death; another in 16 vols. 8vo., printed in 1809. The 'Arminian Magazine,' now called the 'Methodist Magazine,' was established by Wesley in 1780, and was conducted under his superintendence as long as he lived.

WESLEY, REV. CHARLES, the younger brother of John Wesley, was born at Epworth in 1708, and was educated at Westminster School under his brother Samuel. He was elected to Christchurch, Oxford, in 1726, and from this time his history makes part of that of his brother, with whose labours in the diffusion of his religious views and in the establishment of Methodism he was associated from their commencement. In 1749 Charles was married by his brother, at Garth in Brecknockshire, to Miss Sarah Gwynne, a lady of a good family in that county. After his marriage he confined his ministrations almost entirely to London and Bristol. Charles Wesley was an able preacher. He died in London, March 29, 1788. Two of his sons, whom, contrary to his brother's wish, he had educated as musicians, became very distinguished in their profession.

WESLEY, CHARLES and SAMUEL, sons of the Rev. Charles Wesley, were both distinguished for their precocious manifestation of musical genius. When between two and three years old each could play well on the harpsichord. *Charles Wesley* (born in 1757) attained however little reputation beyond that of a performer. He was for many years organist to St. George's, Hanover Square. He died in 1815.

Samuel Wesley was born in 1766. When about eight years old, he was introduced into all companies as a prodigy, and excited the astonishment of everybody. He then received some instruction on the harpsichord, as well as in composition, and studied the violin; and in 1777 he published eight lessons for the harpsichord, and began to consider music as his profession. His prospects were early clouded by his having fallen, in 1787, into an excavation for the foundation of a building in London. He was an invalid for seven years, and though eventually enabled to resume his profession, he was subject to relapses which wore out his strength. He died Oct. 11, 1837.

Mr. Wesley wrote a grand mass for the chapel of Pope Pius VI., and composed and published a complete Service for the use of English cathedrals. He produced many other compositions, but his reputation rests more upon his skill as an organist than upon his published works.

WESSELING, PETER, was born on the 7th of January, 1692, at Steinfurt in Prussian Westphalia, where he received his first education. In 1712 he went to the university of Leyden, where he studied the classical languages under Perizonius, Gronovius, and Wesselius; and in 1714 he went to the university of Franeker, in West Friesland, where he finished his studies under Vitringa, Andala, and Bosius. In 1717 he was appointed conrector of the lyceum at Middelburg, with the title of prorector; in 1719 he was appointed professor of history and eloquence in the lyceum of Deventer; and in 1723 he became professor of history and eloquence in the university of Franeker, which office he held during eight years. In 1735 he was appointed professor of Greek, and Roman and Greek antiquities, at Utrecht; in 1746 the chair of philosophy of law, or 'jus naturæ,' as well as that of the public Roman and German law, was conferred upon him. He became director of the public library at Utrecht about 1750. He died in November, 1764. He had deservedly a high reputation as a learned man and a sound critic. Among his chief works are an edition of Diodorus Siculus, Amsterdam, 1745-6, 2 vols. folio, with notes; an edition of Herodotus, 1763, folio, with notes; 'Veterum Romanorum Itineraria,' Amsterdam, 1735, 4to.; besides other learned works.

WEST, GILBERT, was the son of the Rev. Dr. West, by whom an edition of Pindar was published at Oxford in 1697, and who died in 1716. West is supposed to have been born about 1705. He was educated first at Eton and afterwards at Oxford; and then entered the army, having obtained a commission through his uncle, Lord Cobham. He however soon resigned his commission, and became private secretary to Lord Townshend, by whom he was nominated to the reversion of a clerkship in the privy council, to which he succeeded in 1752; and soon after his friend Pitt, now in office, made him treasurer of Chelsea Hospital. He died March 20, 1756, from the effects of a stroke of palsy. Gilbert West is the author of several poetical productions, of which his version of some of the Odes of Pindar, first published in 4to., in 1749, are the best known. He also wrote 'Observations on the Resurrection,' first published in 1730, and since often reprinted.

WEST, BENJAMIN, was born Oct. 10, 1738, at Springfield, in Pennsylvania. His parents were Quakers. West gave early indications of his talent for drawing, and in his 9th year he was introduced to a painter named Williams, at Philadelphia, who gave him Du Fresnoy's and Richardson's works to read. His first patron was Mr. Wayne, who gave him a dollar each for three boards upon which he had drawn some figures. His first painting which attracted much notice was the portrait of Mrs. Ross, of Lancaster, in Pennsylvania. He afterwards painted other portraits, and also a picture of the death of Socrates. When he was about 16 years of age West served for a time as a volunteer in the royal army, but was soon called home by the illness of his mother, and after her death he established himself as a portrait-painter at Philadelphia. From Philadelphia he went to New York, whence, through the kindness of two merchants, he was enabled to go to Rome. He arrived at Rome in July, 1760, and while there painted a portrait of Lord Grantham, which was placed in the gallery of Crespigné, where it was generally supposed to be by Mengs. After this West went to Leghorn, where he was confined eleven months through a fever.

When he recovered he set out on a tour, and after he had examined all that was worth studying in Florence, Bologna, Venice, and Parma, he returned to Rome, and painted two pictures, one of Cimon and Iphigenia, and another of Angelica and Medora. He was elected a member by the academies of Florence, Bologna, and Parma.

In 1763 West visited England on his way back to his own country; and in London he soon made connections. He painted the Parting of Hector and Andromache for Dr. Newton, and the Return of the Prodigal Son for the Bishop of Worcester. His success was such as to induce him to remain in England.

George III. desired to see the young painter, and gave him a commission to paint a picture for him of the Departure of Regulus from Rome. This was the commencement of nearly forty years' intimacy with George III. The picture was exhibited in the first exhibition of the Royal Academy, of which West became one of the principal members. His Death of General Wolfe was the first work which caused much discussion among artists. Instead of representing the characters in Greek and Roman costumes, as was then usual, he painted them in their own dresses; an innovation which Sir Joshua Reynolds had tried to dissuade him from. West now continued to produce in rapid succession a series of large historical pictures. He painted for the king the Death of Epaminondas, the Death of the Chevalier Bayard, Cyrus liberating the Family of the King of Armenia, Segestus and his Daughter brought before Germanicus, and eight large pictures from subjects of English history.

Upon the death of Reynolds, in 1792, West was unanimously elected president of the Royal Academy, on which occasion he declined the honour of knighthood.

After West had completed the historical works at Windsor, he proposed to the king to paint a great series upon the Progress of Revealed Religion for the chapel at Windsor. Before accepting the proposal the king consulted some of the dignitaries of the church, and his subjects, amounting to 35, were approved of by them. He sketched all the subjects, and was proceeding with the paintings, when, in 1801, during the illness of George III., he was ordered to suspend the execution of them. When the king recovered, he directed West to continue his work, and 28 were executed, when, on his Majesty's final seclusion from business, his payment of 1000*l.* per annum was stopped, and he was directed to proceed no farther with them. After the peace of Amiens West visited Paris, where he was well received. After his return he retired from the president's chair in the Academy owing to a strong opposition among its members; but in the following year, 1803, he was restored.

When West lost the patronage of the court, although 64 years of age, he commenced a series of large religious works. The first was Christ Healing the Sick, which was purchased by the British Institution for 3000*l.*, and presented to the National Gallery. In 1814 he exhibited a picture of Christ rejected by the Jewish High-Priest, one of his best works; and in 1817 he exhibited his extraordinary picture of Death on the Pale Horse, from the Revelations. West died in Newman Street, London, March 11, 1820, and was buried in St. Paul's Cathedral.

West's works are numerous: he painted or sketched about four hundred pictures, and he left about two hundred drawings in his portfolios. In colouring he was not very successful: his pictures are too often of a uniform reddish-brown tint; and in expression he was decidedly deficient in character, and monotonous both in feature and countenance. In invention he has frequently shown great power. There is a full-length portrait of West, by Sir Thomas Lawrence, in the National Gallery.

WEST INDIES is a term at present exclusively applied to the archipelago which constitutes the eastern boundary of the Gulf of Mexico and the Caribbean Sea, and separates them from the Atlantic. On the west this mediterranean sea is divided from the Pacific by the Mexican Isthmus. The term was adopted when it was known that the countries discovered by Columbus did not form a part of India or Hindustan, and it was for some time synonymous with America, until it was gradually restricted to its present signification. Geographers sometimes call these islands the Columbian Archipelago, as nearly all the islands were discovered by Columbus. This archipelago extends from 10° to 27° 30′ N. lat. and from 59° 30′ to 85° W. long., and the islands are divided into three groups: the Bahamas, between 20° and 27° 30′ N. lat. and between 70° and 80° W. long.; the Greater Antilles, between 18° and 23° 30′ N. lat. and 65° and 85° W. long.; and the Lesser Antilles, extending from 10° to 19° N. lat. and from 59° 30′ to 66° W. long.

The most northern portion of this archipelago, or that part which is north of 20° N. lat., rests on an extensive bank, which is intersected by arms of deep water. [Bahamas.]

The extensive banks which surround the greater part of the island of Cuba prove that this island rests on a bank similar to the Great Bahama Bank. [Cuba.] The mountainous portion of Cuba evidently belongs to another region, which extends eastwards through St. Domingo as far as the Virgin Islands. [Hispaniola; Virgin Islands.] The strait which lies between Virgin Gorda and Anguilla separates this region from the islands of volcanic origin, which extend from 12° to 18° 20′ N. lat. and between 60° 50′ and 63° 10′ W. long. in a curved line. These islands consist for the greater part of mountains and rocks of volcanic origin. Tobago and Trinidad, which are still farther S., consist chiefly of primitive rocks.

Climate and Productions.—All the islands of the Columbian Archipelago, with the exception of the most northern Bahamas, are within the tropic; and their climate, as in other countries thus situated, is regulated by the progress of the sun, and the trade-winds, which depend on that progress. The year is divided into two seasons, the dry and wet. All the islands which are south of 18° N. lat. have two dry and two wet seasons, and this is also the case with the southern

shores of the islands of Puerto Rico, Hispaniola, and Jamaica. On the island of Cuba and on the northern coasts of the other Greater Antilles and the Bahamas, the seasons are not so distinctly marked. The mean annual temperature is 78°.

When the sun is in the southern hemisphere the archipelago enjoys the full benefit of the trade-winds, blowing from N.E. and E.N.E., and diffusing over it a refreshing coolness. But when the sun has passed the equator, the trade-winds retire to the northward as far as 15° or 16° N. lat., and are replaced by S.E. winds, which are warm and usually gentle. Hurricanes are frequent from August to October; and earthquakes occasionally occur.

The currents which flow around the several islands, and between them and the mainland, are described under ATLANTIC OCEAN, and under the names of the principal islands. The natural productions are also described under separate articles.

Divisions and Area.—The West India Islands contain 86,023 square miles; viz., the Bahamas 5424, the Greater Antilles 75,638, and the Lesser Antilles 4961 square miles. With the exception of Hispaniola, which is an independent republic, the islands composing this archipelago are subject to six different European nations—the Spaniards, English, French, Danes, Dutch, and Swedes.

The Spanish possessions are the largest, and comprehend more than half the area of the archipelago; they consist of—

	Square Miles.
Cuba, with its dependencies	43,412
Puerto Rico	2,970
Culebra and Bique	55
	46,437

The English possessions are next in extent. They consist of—

Jamaica, one of the Greater Antilles		4,256
The Bahamas		5,424
And the following Lesser Antilles:		
Virgin Islands (Tortola, &c.)	94	
Anguilla	29	
Barbuda	72	
Antigua	107	
St. Christopher	68	
Nevis	38½	
Montserrat	47	
Dominica	277	
Santa Lucia	275	
Barbadoes	164	
St. Vincent	131	
Grenadines	30	
Grenada	109	
Tobago	120	
Trinidad	2030½	
		3,592
		13,272

The French possess only a few of the Lesser Antilles, namely—

Guadaloupe, with several smaller islands in its vicinity	631
Martinique	380
	1,011

The Danes possess three of the Virgin Islands, viz. St. John, St. Thomas, and Santa Cruz 164

The Dutch possessions consist of three Lesser Antilles, viz. St. Eustatius, Saba, and St. Martin 114

Population and Inhabitants.—The populatio is supposed to amount to about 3,250,000, which Hispaniola and Cuba have alone nearl 2,000,000. The original inhabitants of all th islands are extinct, with the exception of a fe families of Caribs, on the islands of St. Vince and Trinidad. The present population is compose of whites and negroes, and the offspring of thes two races. In the British West India Islands th negroes constitute about three-fourths of the p pulation; in Cuba, about one-half; but in Puer Rico, only one-sixth. The proportion betwee the two races in the islands which belong to oth European nations is nearly the same as in th British islands. In Hispaniola both races are mixed, that the bulk of the people are considere mulattoes.

Since the abolition of negro slavery in th British West Indies in 1834, immigrants an liberated Africans have arrived there to assist cultivating the sugar estates. Their numbe from 1834 to 1849, was, in—

Jamaica	14,519
Trinidad	13,356
Grenada	1,476
St. Vincent	1,197
Antigua	1,075
Dominica	732
Nevis	427
St. Kitt's	95
	32,877

The British produce and manufactures export to the British West Indies in 1849 were valu at 1,521,954*l.*

The imports from the British West Indies a Honduras in 1849 included—

Cocoa	3,159,086 lbs.
Coffee	3,596,839 lbs.
Molasses	605,628 cwts.
Rum	4,329,640 galls.
Sugar	2,897,837 cwts.

The imports from the foreign West Indies a Hayti in 1848 included—

Coffee	3,639,108 lbs.
Molasses	95,893 cwts.
Rum	156,185 galls.
Sugar	957,015 cwts.
Tobacco	573,316 lbs.

The greater number of the islands composi the Columbian Archipelago were discovered Columbus. [COLUMBUS.] The other islands we discovered either in his time or soon afterward and the different European nations before me tioned made settlements upon them. See separ articles on all the large islands.

WESTALL, RICHARD, R.A., was born 1765. In 1779 he was apprenticed to an graver on silver in London, and he obtained lea to draw in the evenings at the Royal Acaden On the expiration of his apprenticeship, in 17

he took, jointly with his friend Mr. Lawrence (afterwards Sir Thomas Lawrence), a house in Soho Square, which they held together for some time.

The first performances of Westall that attracted notice were some highly-finished historical pieces in water-colours, in which he was without a rival. He made a series of designs for Alderman Boydell's editions of Milton and Shakspere; and he furnished an immense number of small designs for booksellers, as embellishments and illustrations to different works. He was elected R.A. in 1794. His last occupation was giving lessons in drawing and painting to her present Majesty while Princess Victoria. He died Dec. 4, 1836.

WESTBURY. [WILTSHIRE.]

WESTERHAM. [KENT.]

WESTERN AUSTRALIA, in its widest acceptation, extends over the western portion of the Australian continent, and lies between 14° and 35° S. lat. and between 113° and 129° E. long.

We are particularly acquainted only with that portion of it where British colonies have been settled, and which has been generally known as the *Swan River Settlement*. With the exception of the country immediately north of the settlements and contiguous to the sea, the remainder is very imperfectly known.

Australind is the name which was given to that part of Australia lying between Gantheaume Bay, in 27° 40′, and the Arrowsmith River, in 29° 30′ S. lat. Captain Grey explored this region; and he considered that it presented great advantages for a settlement. It contains a harbour superior to those hitherto made available in Western Australia. This harbour, named in honour of the enterprising traveller who described it, Port Grey, is situated in lat. 28° 55′ S.

The limits of the Colony of Western Australia to the N. and E. remain unsettled; but it may for the present be considered as extending from about 30° S. lat. to the S. point of the coast, or 35° 10′ S. lat., and from the W. coast inwards to about 120° E. long., comprising an area altogether of about 90,000 square miles. The population of the settled districts in 1848 was 4460, exclusive of about 2000 aborigines.

A range of mountains called the Darling Mountains extends S. to N. nearly the whole length of the colony, at a distance from the coast varying from 15 to 50 miles, and rising from 800 to 2000 feet above the level of the sea. They contain roofing-slate, limestone, marl, selenite, iron-ore, chromate of lead, and copper. Nearly all the rivers which flow to the westward appear to take their rise in the Darling Mountains. Between the mountains are ravines, bounded by inaccessible cliffs, and wide valleys, bordered by fertile plains, which occur where the basaltic rocks are developed. In that part of the colony which borders on the south coast, there are three distinct parallel ranges of mountains, running from S. to N.

In 1847 Dr. Van Sommer discovered, while making a geological survey ordered by the governor, a vast bed of coal in Western Australia.

The rivers on the west coast of Australia generally rise at no great distance from the sea. Near their sources they are mountain-torrents, but in the low lands they become slow streams. They are liable to sudden rises; while at other times their channel, in some places many feet deep, is quite dry. They offer little or no facility for internal navigation. The Swan River rises about 32° 30′ S. lat. 117° E. long., and is at first named the Avon. It flows N. and then W., and enters Cockburn Sound by an æstuary in 32° 4[illegible] S. lat. 115° 45′ E. long. It receives many affluents, and there are several fertile tracts along its banks. The Canning enters the æstuary of the Swan River from the S. The other chief rivers are—the Murray, the Harvey, the Preston, the Colley, the Vasse, the Blackwood, the Donnelly, and the Kalgan. The climate has the same general character as that of New South Wales, and, though generally dry, is healthy. The temperature is said to resemble that of the south of Italy, parts of Spain and Portugal, and the Cape of Good Hope. The temperature is rather variable; but the colony is not so uncertain as New South Wales in the supply of rain. Major Irwin divides the seasons into wet and dry, and represents the first as beginning generally in March and ending in November, the rain not being heavy except in August and September. The height of the dry season is in January, when the nights are distinguished by heavy dews. By December the grain is ripe. Hay is cut in November. Tomatos, pumpkins, gourds, vegetable-marrow, chillies, egg-plants, besides every English vegetable, ripen in the open air; and also a great variety of fruits.

The information given under AUSTRALIA, concerning the aboriginal inhabitants, is in general applicable to Western Australia.

Western Australia is at present divided into 26 counties. The capital is *Perth*, which is situated on the N. side of the æstuary of the Swan River, in 31° 53′ S. lat., 115° 50′ E. long., about 10 miles from the sea. It is gradually extending, but the houses are scattered over a considerable extent of ground, and the population is yet small. *Freemantle* is situated at the S. side of the æstuary of the Swan River, near the sea. *Albany* is situated on the S. coast, within King George's Sound, near 118° E. long. *Augusta* is also situated on the S. coast, near Cape Leeuwin, and at the mouth of the Blackwood River.

Western Australia dates its history as a British colony from the year 1829. Its progress has hitherto been comparatively slow. The imports in 1848 were valued at 45,411*l.*; the exports at 29,598*l.* The shipping inwards was estimated at 15,494 tons; outwards, at 13,957 tons. The wool exported amounted to 301,965 lbs., valued at 9666*l.* The gross revenue was 18,188*l.*, but this included a sum of 7695*l.* voted by the British parliament for the service of the colony.

There is a governor of Western Australia, and the colony is subject to the regulations of the Australian Colonies Act, 13 & 14 Vict., c. 59.

WESTMEATH. [MEATH, WEST.]

WESTMINSTER, a city in the county of Middlesex, one of the constituent parts of the British metropolis, containing the royal residence, the houses of the legislature, the supreme courts

of law, the chief public offices of the executive government, and the magnificent abbey church of St. Peter. [LONDON.]

The city appears to have owed its origin to a church erected here by Sæbyrht or Sebert, king of the East Saxons (or, to follow Camden, of the East and Middle Saxons), and dedicated to St. Peter. Sæbyrht died about the year 616.

The church of Sæbyrht appears to have been destroyed by the Danes about the time of Alfred, and remained desolate until the reign of Edgar, who caused it to be rebuilt, and established in the place, about 958, a Benedictine priory or abbey of twelve monks. In the reign of Edward the Confessor Westminster was the residence of royalty. The palace built or occupied by Edward appears to have been on or near the site of the present houses of parliament: it has given name to Old and New Palace Yard, Palace Stairs, &c. The abbey church of St. Peter at Westminster was rebuilt by Edward the Confessor with great magnificence, and that prince, on his decease in 1066, was buried in it.

After the Conquest Westminster continued to be the usual residence of the kings of England, and St. Peter's abbey the usual place of their coronation. Edward I. afterwards fixed in the bottom of the inauguration chair a stone which he had brought from Scone in Scotland, the possession of which was thought to secure possession of that kingdom. William Rufus built a hall as a banqueting-room to the palace, which, restored by Richard I., is the present Westminster Hall.

Henry III. began to rebuild the abbey church of St. Peter, having caused the ancient edifice of Edward the Confessor to be pulled down in 1245. He had previously built a new Lady-chapel. He was buried in the new church, 1273, and several of his successors on the throne have also been buried there. The new church was not completed until long after Henry's death.

In the reign of Henry VII. the Lady-chapel of St. Peter's, built by Henry III., was pulled down, and in place of it was built the more extensive and costly structure now known as Henry the Seventh's Chapel. This was the last important addition or alteration made in the abbey before the Reformation, or indeed until early in the last century, when the western towers were rebuilt under the direction of Sir Christopher Wren. Since that time the whole of the exterior of Henry VII.'s Chapel and several other parts of the abbey have been renovated, but no additions have been made.

The extreme length of the abbey is 530 feet 9 inches. The extreme breadth is 220 feet. The length of the nave is 154 feet. The height of the nave is 105 feet. The height of the towers is 225 feet.

Westminster Abbey has been made the place of interment not only for several of the kings and royal family of England, but for a great number of poets, statesmen, judges, naval and military commanders, and others, who have made themselves illustrious by their talents or actions.

WESTMINSTER ASSEMBLY OF DIVINES. One of five bills to which it was proposed by the parliamentary commissioners tha King Charles I. should give his consent in th negociations at Oxford (from 30th January t 17th April, 1643) was entitled 'A Bill for callin an Assembly of learned and godly Divines an others to be consulted with by the Parliament fo the settling of the government and liturgy o the Church of England, and for the vindicatio and clearing of the doctrine of the said churc from false aspersions and interpretations.' Thi bill was afterwards converted into 'An Ordinanc of the Lords and Commons in Parliament,' an passed 12th June, 1643.

The ordinance of the Lords and Common authorised the members of the Assembly, unt further order should be taken by the two house 'to confer and treat among themselves of suc matters and things touching and concerning th liturgy, discipline, and government of the Churc of England, or the vindicating and clearing the doctrine of the same,' &c., as should b 'proposed to them by both or either of the sai houses of parliament, and no other,' and deliver their opinions and advices to the sai houses from time to time in such manner an sort as by the said houses should be require They were not empowered to enact or settle any thing. The Assembly of Divines continued sit under that name till the 22nd of Februar 1649, having existed five years, six months, an twenty-two days, during which time it had me 1163 times. An ordinance of the parliamen changed the body into a committee for trying an examining ministers, and it continued to hol meetings for this purpose every Thursday mornin till Cromwell's dissolution of the Long Parliamen March 25, 1652, after which they never met agai

The Assembly's Directory for Public Worshi was submitted to parliament on the 20th of Apri 1644. The first part of their Confession Faith was laid before parliament in the b ginning of October, 1646, and the remainde on the 26th of November in the same yea Their Shorter Catechism was presented to th House of Commons on the 5th of Novembe 1647; their Larger Catechism on the 15th September, 1648.

The Directory for Public Worship was approve of and ratified by the General Assembly of th Church of Scotland held at Edinburgh in Feb 1645; the Confession of Faith, by that held August, 1647; the Larger and Shorter Cat chisms, by that held in July, 1648; and the formularies still continue to constitute th authorised standards of that establishment. Th Directory of Public Worship was ratified by bot houses of the English parliament on the 2nd October, 1644; and also the doctrinal part the Confession of Faith, with some slight verb alterations, in March, 1648. On the 13th October, 1647, the House of Commons passed a order that the Presbyterian form of church g vernment should be tried for a year; but it w never conclusively established in England b legislative authority; and even what was done b the parliament in partial confirmation of the pr posals of the Westminster Assembly of Divine

was regarded as invalid at the Restoration, when episcopacy resumed its authority without any act being passed to that effect.

WESTMORLAND or WESTMORELAND, a northern county of England, is bounded N.W. and N. by Cumberland, S.W. and S. by Lancashire, S.E. and E. by Yorkshire, and N.E. by the county of Durham. It lies between 54° 10′ and 54° 42 N. lat., and between 2° 9′ and 3° 10′ W. long. The greatest length N.N.E. to S.S.W. is about 41 miles; the greatest breadth, at right angles to the length, is about 32 miles. The area is 762 square miles. The population in 1841 was 56,454.

Surface and Geology.—Westmorland is wholly mountainous. The eastern side is traversed by the great Pennine Chain; the western side and the centre are occupied by the mountains of the Cumbrian group, which are separated from the Pennine Chain by the valley of the Eden.

The principal ridge of the Pennine Chain enters the county across its northern border just to the south of Cross Fell, and extends across Milburn Forest S.S.E. by Brough to the border of Yorkshire in Arkengarth Forest; it then turns S.S.W., and runs, above Kirkby Stephen, to the head of the valley of the Eden. On each side of the ridge a number of transverse valleys are drained by small streams: those on the west side flowing into the Eden; those on the east forming the upper waters of the Tees, the Swale, and the Ure or Yore. One of the highest mountains of the Pennine Chain is the Nine Standards, which has an elevation of 2136 feet.

The principal range of the Cumbrian Mountains crosses the county on the S. from E. to W., beginning near the Nine Standards, at the head of the valley of the Eden, here very narrow, and by which the Cambrian range is separated from the Pennine Chain. That range extends in Westmorland to Bow Fell (2911 feet high), whence the mountains extend northwards to the shores of Ulleswater and the valley of the Lowther, which is the most western part of the valley of the Eden. Many of this great group of mountains are very lofty. Helvellyn, which is just within the border of Cumberland, is 3055 feet high. Two small groups of less elevation in the S.E. part of the county lie on each side of the valley of the Lune.

Geologically the county may be regarded as consisting of three parts. The slate rocks of the Cumbrian mountain group form the first part or division; the formations of the great carboniferous and mountain limestone series of the north of England, of which formations the Pennine Chain forms the western outcrop, constitute the second division; and the new red sandstone of the valley of the Eden forms the third division.

Rivers and Lakes.—The Pennine Chain of mountains separates the waters which flow into the Irish Channel from those which flow into the German Ocean. Westmorland is chiefly on the western side of the chain; but a small portion is on the eastern side of the ridge, and in this some of the upper waters of the Tees have their source. All the streams which belong to the eastern slope of the Pennine Chain have scarcely any part of their course in Westmorland, as the ridge of that chain which determines the watershed lies very near the eastern border of the county.

On the western side of the Pennine Chain the county is divided by the principal ridge of the Cumbrian Chain into two basins. On the N. is the basin of the Eden; on the S. the basin of Morecambe Bay, drained by the Kent, the Lune, and other streams, which flow into that æstuary.

The Eden rises on the border of Westmorland and Yorkshire, on the side of Hugh's seat, one of the mountains of the Pennine Chain. Its course for the first two miles is S.; it then abruptly turns to the N., and then flows N. past Kirkby Stephen, and afterwards N.W. past Appleby into Cumberland. [CUMBERLAND.] Its course in Westmorland is 30 miles; in Cumberland about the same; making a total of nearly 60 miles. No part of its course in Westmorland is navigable.

The Eden receives several affluents, the chief of which is the Eamont, which flows from the Cumbrian Mountains into Ulleswater at its upper end, whence it flows from the lower end to the Eden. Its total length, including Ulleswater, is about 20 miles. About four miles above its junction with the Eden it receives the Lowther. Ulleswater, which is an expansion of the Eamont, is about seven miles long, with an average width of half a mile. Haweswater is formed by the expansion of the Mardale Beck, an affluent of the Lowther.

The Lune, the Kent, and the Winster, drain the basin of Morecambe Bay. The Lune rises on the northern side of the ridge which connects the Cumbrian Mountains with the Pennine Chain. It flows N., then W., and afterwards S., partly in the county, partly on the border, to Kirkby Lonsdale, a little below which it quits the county to enter Lancashire. No part of its course of 27 miles in Westmorland is navigable. The Kent rises in the Cumbrian Mountains, and flows by the town of Kendal into Morecambe Bay. Its whole course of 23 miles belongs to Westmorland: it is not navigable. The Winster, also called the Pool, rises in Westmorland, and flows along its border by Lancashire into Morecambe Bay.

The large lake of Windermere is partly in Westmorland and partly in Lancashire. [LANCASHIRE.] Ulleswater is partly in Cumberland. [CUMBERLAND.] A short distance N.W. from the head of Windermere are the beautiful small lakes of Grasmere and Rydal Water, besides which, in the vicinity, are several tarns, or very small lakes, belonging mostly to small valleys or circular recesses. Loughrigg Tarn is one of the most beautiful.

Railways and Canal.—A railway extends from Lancaster through Kendal and Penrith to Carlisle, and a branch from Kendal runs to the eastern side of Windermere. There is only one canal, which commences on the east of Kendal, and passes by Burton-in-Kendal to Lancaster and Preston in Lancashire.

Agriculture.—Although this county, from its mountainous nature, is more interesting in a picturesque than in an agricultural point of view, it contains some very fertile valleys, in which there

are many well-cultivated farms. The climate is mild and moist in the valleys: the high hills condense the clouds which come over the Atlantic, and cause frequent and abundant rains, which keep the pastures green, but are not so favourable to the ripening of the corn. Much snow often accumulates in winter. The greater part of the mountainous surface is only fit for sheep-pastures or for plantations of timber-trees.

The soil in the valleys is mostly a dry gravelly mould, composed of different earths washed down from the hills, and forming a soil well fitted for the cultivation of turnips, of which great crops are raised on some well-managed farms. Towards the east and north of the county the soil is more inclined to clay; and, unless this be well drained, the land is too wet, in spring and autumn, to admit of clean and careful cultivation. Wherever the water has no sufficient outlet, basins of peat are formed; but these are not so extensive as they are in many other hilly countries, owing to the calcareous rocks which form the substratum of a great part of the hills, and which, being porous, prevent the accumulation of water, except in those parts where they form the lakes which make this county so interesting to travellers.

From Kirkby Stephen to Brough and Appleby, and thence to Temple Sowerby, the soil is a deep sand, which in a dry country would be very unproductive; but which the moisture of the climate of Westmorland renders more compact on cultivation. Turnips and potatoes grow well here when plenty of manure is put on. Lime is a great improver of the soil, and fortunately abounds in the county. Near Kendal a great breadth of potatoes is planted for the supply not only of the immediate neighbourhood, but also of the adjacent counties, many thousand loads being annually sent into Lancashire and Yorkshire.

Grass land being abundant and the climate favourable to pastures, a great portion of the soil is devoted to the maintenance of cattle. Good meadows let at a high rent, and are carefully manured with composts. Great crops of hay are made in favourable years.

Divisions and Towns.—Westmorland is divided into 4 wards. It is in the dioceses of Carlisle and Chester. It is in the Northern Circuit, and the assizes are held at Appleby. The county returns 2 members to parliament, and one member is returned for the borough of Kendal.

The following are the principal towns, with the population of each in 1841:—

Ambleside, a market-town, 14 miles N.W. from Kendal, is situated in a beautiful valley near the upper end of Windermere, and on the little river Rothay, or Raisebeck. The town is laid out in a rambling irregular manner, which however combines with the peculiarities of its situation to impart to it a more picturesque character. The chapel is in the highest part of the town, and is a plain but neat and commodious building, rebuilt in 1812. Ambleside is a place of considerable resort for visitors to the lakes of Cumberland and Westmorland, and has some good inns. Ambleside is a chapelry in the parish of Grasmere. Population of the chapelry, 1281.

Appleby. [APPLEBY.]

Brough, a market-town, 28 miles N.E. from Kendal, is divided by the Helbeck, a small feede of the Eden, into two parts, respectively desig nated Market Brough and Church Brough. Th houses are plain, but tolerably commodious. Th church is large, but of poor architecture, mostly o late perpendicular character: it has a square em battled western tower. Population of the town ship, 899.

Burton-in-Kendal, a market-town, 12 miles S by E. from Kendal, is well built, and has a re spectable appearance, though many of the house are old. There is a good market-place, with stone cross in the centre. The church is an ol building of plain architecture, with a square towe Population of the parish, 2387.

Kendal, or more accurately *Kirkby-Kendal*, market-town, municipal borough, and parliamentar borough, is the largest and most important tow in Westmorland. It is situated chiefly on th slope of a hill rising from the right or west ban of the Kent. One principal street runs nearl parallel to the course of the river, over whic are three stone bridges; another principal stre branching from this leads to the northernmost the three bridges, and connects Kendal with suburb on the east bank of the river. The stree are macadamised, and lighted with gas. Th houses in the principal streets are generall good, built of limestone and roofed with blue slate many of those in the narrow streets or lanes ope ing into the main streets are old houses, of roug stone plastered. The church is chiefly of la perpendicular character, and remarkable for i unusual width. It has a low tower. The tow also contains a chapel of ease, rebuilt in 184 on the east bank of the Kent, another churc erected in 1837, several dissenting meeting-house and a Roman Catholic chapel; a town-hall, house of industry, and a house of correctio On the east side of the river are some ruins of t old castle of the barons of Kendal. The Castl How, or Castle Law Hill, an ancient earthwor is on the west side of the town, opposite t castle. On the top is an obelisk erected in co memoration of the Revolution of 1688.

Considerable manufactures are carried on Kendal of cotton checks, kerseys and oth woollens, linsey, blanketing, fancy waistcoatin carpets, girths, hosiery, sacking, and worsted.

Kendal was made a market-town by licen from Richard I., and became, by the settlement the Flemings, in the reign of Edward III., t seat of a considerable manufacture of woolle cloths (which took from the town the name Kendals), and continued to be so down to qu modern times.

The municipal borough is divided into 3 war and is governed by 6 aldermen, of whom one mayor, and 18 councillors: population, 10,22 The parliamentary borough returns one membe population, 11,519.

Kirkby-Lonsdale, a market-town, 12 miles S. from Kendal, is situated on the west bank of t Lune, over which is an ancient stone bridge. consists of several streets, the three princi

meeting in the market-place in the centre. The houses are well built of freestone and roofed with slate. The church is large, divided into four aisles or portions by three rows of pillars; it has a square tower 68 feet high. Population of the township, 1629.

Kirkby-Stephen, a market-town, 23 miles N.E. from Kendal, stands on the west bank of the Eden, and consists principally of one street parallel to the river. The houses are generally pretty good. The church is a large ancient building with a square tower. There is a modern market-house. Population of the township, 1345.

Milnthorpe, a market-town, 8 miles S. by W. from Kendal, stands on the north bank of the river Beetha, near its entrance into the æstuary of the Kent, and consists chiefly of one long street nearly parallel to the river, over which, at the lower end of the town, is a bridge of one arch. The houses are many of them neat. Milnthorpe is in the parish of Heversham. The church of Heversham is about a mile north from the town. There is an episcopal chapel. Milnthorpe is a member of the port of Lancaster: small vessels by the help of the tide get up the river to the town. Population of the township, 1159.

Orton, a market-town, 14 miles N.N.W. from Kendal, consists chiefly of one irregular street, neither paved nor lighted. The church is an ancient building with a low embattled tower. Population of the township, 558.

Shap, a small market-town, 16 miles N. by W. from Kendal, stands on a small stream, an affluent of the Lune, and consists of one long street, extending along the mail-road from Lancaster by Kendal to Carlisle and Glasgow. The church retains some ancient parts amid many alterations. Some picturesque ruins of an abbey which formerly stood here still remain on the west bank of the stream. Population of the parish, 898.

History and Antiquities.—In the earliest historical period this county appears to have been included in the extensive territory of the Brigantes; and upon the subjugation of South Britain by the Romans, it was comprehended in the province of Maxima Cæsariensis. The Eden, with its æstuary the Solway Frith, is apparently the Ituna (Ἰτούνα) of Ptolemæus, and the Bay of Morecambe is the æstuary of Moricambé (Μοριχάμβη εἴσχυσις) of the same writer.

A number of Roman inscriptions have been found in Westmorland, several of which are given in Horsley's 'Britannia Romana.'

Westmorland was probably conquered by the Angles of Northumbria, under Egfrid, about 685. It became part of the kingdom of Northumbria, of which it shared the fate. The county is mentioned only once in the Saxon Chronicle, where it is called 'Westmoringaland.' William the Conqueror erected the baronies of Westmorland and Kendal. Little notice of the county occurs in history, except in the record of some of the Scottish invasions. The earldom of Westmorland was created by Richard II. in favour of Ralph Nevill of Raby: it was forfeited by Charles Nevill, who was one of the leaders of the great rising in the north against Queen Elizabeth.

The castles of Appleby, Kendal, Brough, Buley, Howgill, and Brougham, with Shap Abbey, are the principal remains of the buildings of the middle ages. Of Brougham Castle there are considerable remains. The keep is standing, but all the inner apartments are destroyed, except one vault, the roof of which is formed of groined arches supported by an octagon pillar in the centre.

In the civil war of Charles I. Appleby Castle was occupied by a royalist garrison, but was obliged at last to surrender.

There are some monuments generally regarded as Druidical. On the waste near Helton, between the rivers Lowther and Eamont, is a remarkable upright stone called Helton-Copstone, and about a quarter of a mile to the north of it is a circle of stones, ten yards in diameter, called the Druids' Cross. Another circle 21 yards in diameter, called the Cock-Stones, stands at the head of Ellerbeck, in the neighbourhood of Ulleswater. There is a circle 70 feet in diameter, formed of large stones, on Lowther Scar; and near Shap are the remains of two converging lines of huge stones of unhewn granite, called Carl Lofts. Pennant, who has described this monument, assigns it to the Danes. In Gunnerkild Bottom, near Shap, is a circle of stones called the Druids' Temple, which has certainly been used for a burying-place.

WESTPHALIA, *the Circle of*, one of the old divisions of Germany, was bounded W. by the Netherlands, N. by the German Ocean, E. by Lower Saxony, and S. by the circle of Lower Rhine, and comprehended the bishopricks of Münster, Paderborn, Osnaburg, Liege, and Corvey, the duchies of Jülich, Cleves, Berg, and Oldenburg, the principalities of Minden, Verden, and Friesland, the counties of Ravensburg, Mark, Hoya, Diepholtz, Schaumburg, Lippe, Bentheim, Tecklenburg, Lingen, Steinfurt, Rietberg, and many ecclesiastical and temporal lordships.

WESTPHALIA, *the Kingdom of*, was erected on the 15th of November, 1807, and consisted of the territories of Brunswick-Wolfenbüttel and Hesse-Cassel (with the exception of Hanau and Katzenelbogen), the Prussian provinces of Magdeburg and the Old Mark on the left bank of the Elbe, Halberstadt with Hohnstein, Hildesheim with Goslar, Mansfeld, Quedlinburg, Eichsfeld with Treffurt, Mühlhausen and Nordhausen, Stolberg-Wernigerode, Paderborn, Minden and Ravensberg, the Hanoverian provinces of Göttingen, Grubenhagen, and Osnaburg, the principality of Corvey, belonging to Nassau-Orange, and the county of Rietberg. The area was 14,500 square miles, and the population 1,947,000. Napoleon made his youngest brother, Jerome, king of Westphalia, of which the capital was Cassel. The kingdom was enlarged by the addition of all Hanover in 1810, by which the area was increased to 23,500 square miles, and the population to 2,718,000. A considerable portion of the territory of the kingdom was however soon after resumed and incorporated with the French empire. In 1812 the king led his army to Poland; he himself was sent home by Napoleon; but his fine army of above 24,000 men shared in the ruin of the French in Russia. After the battle of

Leipzig the kingdom came to an end, and the former governments were restored.

WESTPHALIA, *a Province of Prussia*, situated between 50° 43′ and 52° 30′ N. lat., 6° 25′ and 9° 20′ E. long., has an area of 7786 square miles, and a population of 1,464,921. It is bounded W. by Holland; N. by Hanover; E. by Hanover, Brunswick, and Hesse-Cassel; and S. by Hesse-Cassel and the Rhein-Provinz. The part of the province N. of the Lippe belongs to the great plain of northern Germany, and has no mountains properly speaking, though some low eminences run from the Egge to the Weser and to the Porta Westphalica, and pass through the government of Minden into Osnaburg. The surface to the south of the Lippe presents small chains of mountains and hills, which contain many valleys. In the north the soil is in general sandy, with extensive heaths and morasses, and scanty forests: in the south the soil is firm and sand is rare; it is not always productive, but the forests are very fine. The mountains in the province are all offsets of the Hartz. To these belong: the Weser chain: the *Teutoburgerwald*, a remarkable chain which forms part of the watershed between the Weser, the Ems, and the Lippe, and is covered with fine forests of oaks and beeches: and the *Süntelgebirge*, a beautiful picturesque chain, extending from the neighbourhood of Osnaburg, through the district of Minden, to the Steinhuder Lake in Lippe-Schaumburg. The Weser has broken through this chain, about 4 miles below Minden, thus forming the celebrated pass called Porta Westphalica. The principal rivers are the Weser, the Ems, the Lippe, the Röhr, and the Vechta. There are numerous marshes in the northern parts of the province. The climate is temperate and healthy. Agriculture, mining, and cattle feeding, are the chief occupations of the inhabitants. The vegetable products are—corn of all kinds, peas, beans, garden vegetables, fruit, hemp and flax (which are staple articles), hops, and timber. The minerals are—iron, copper, lead, calamine, marble, slate, freestone, salt, and coal: there are extensive turf-moors. The manufactures include linen, cotton, woollen cloth, silk, leather, hosiery, and paper. There are numerous iron, copper, and steel-works, and manufactories of all kinds of cutlery and copper, brass, and iron goods. There are also many sugar-refineries, brandy-distilleries, and tanneries in the province. The commerce in the products indicated and in hams is important. The Cologne-Minden railway, with branches to Münster and Paderborn, traverses the province, and connects it with Berlin, Hanover, Hamburg, and Bremen. The province is divided into three governments, ARNSBERG, MINDEN, and MÜNSTER, under which heads further particulars are given.

WESTPORT. [MAYO.]

WESTRINGIA, a genus of plants belonging to the natural order *Lamiaceæ*. All the species are natives of New Holland.

WETHERBY. [YORKSHIRE.]

WETSTEIN, JOHN JAMES, was descended from a family which had long been one of distinction in the city of Basel. He was born at Basel in 1693. After having studied divinity under his uncle, and Hebrew under Buxtorf, he was admitted a minister of the national church in 1713, on which occasion he printed a Latin thesis in defence of the substantial genuineness and authenticity of the received text of the Greek Scriptures. To this subject he may be said to have thenceforth devoted his life. He visited France and England, as well as the various libraries in Holland, for the examination of manuscripts; he was in England in 1716, and again in 1720, and he appears to have been employed for some years in this work by Bentley, who had himself projected a new edition of the Greek Testament ('Life,' by Monk, pp. 311 and 429). In 1730 Wetstein produced his 'Prolegomena' to a proposed new edition of the Greek text according to the most ancient codices. By this time however his critical investigations had alarmed a party among his clerical brethren, who obtained a decree from the senate of Basel condemning his project as unnecessary and dangerous, and he was even prohibited from officiating as a minister. On this he retired to Amsterdam, where the Remonstrants or Arminians appointed him successor to Le Clerc in the professorship of philosophy and history. On his making a public apology for some opinions savouring of Socinianism that had been ascribed to him, the decree of the Basel senate was reversed in May, 1733, but he remained at Amsterdam for the rest of his life, and died there, March 24, 1754. His edition of the Greek New Testament appeared at last, at Amsterdam, in 2 vols. folio, in 1751 and 1752. Notwithstanding many errors by which it is disfigured, this edition (now become very scarce) is of great value to the critical student.

WETTER LAKE. [SWEDEN.]

WETUMPA. [ALABAMA.]

WEXFORD, a maritime county in the province of Leinster, in Ireland, is bounded E. by the Irish Channel, S. by the Atlantic Ocean, S.W. by Waterford Harbour, W. by Kilkenny, N.W. by Carlow, and N. by Wicklow. The greatest length N.E. to S.W. is about 54 miles; the greatest breadth E. to W. is about 28 miles. It lies between 52° 6′ and 52° 48′ N. lat., and 6° 8′ and 7° 1′ W. long. The area is 901 square miles. The population in 1841 was 202,033.

Coast-line.—The whole line of coast from Arklow (which lies a little N. of the northern boundary of Wexford) to Wexford Harbour, presents no opening which can afford shelter from foul weather, except to small craft; and the danger to shipping is increased by a range of sand-banks which lie parallel to the shore at the distance of a few miles. From Roslare Point, on the S. side of the entrance to Wexford Harbour, to Greenore Point, the coast forms another bay, called Greenore Bay. From Greenore Point, on the S. side of the bay, to Carnsore Point, the coast trends S. by W. It then changes its direction, and runs E. to W., including two small bays before it reaches Crossfarnogue Point, W. of which are Ballyteige Bay and Bannow Bay. From Bannow Bay to the E. point of Waterford Harbour the coast trends S.S.W. On this last part of the coast is the

small dry harbour, used by fishing vessels, called Fethard Bay.

Surface, Geology, and Rivers.—Waterford Harbour and the river Barrow separate Wexford from the counties of Waterford and Kilkenny. At the point of junction of the counties of Carlow, Wexford, and Kilkenny, the boundary is distinctly marked by the ridges called Blackstairs Mountain and Mount Leinster, the former of which rises to elevations of from 1520 to 2409 feet above the level of the sea at low-water, while the latter has an elevation of 2610 feet. Three remarkable summits upon this ridge of mountains, between Wexford and Carlow, are distinguished as 'The Leaps of Ossian's Greyhounds.' A few miles W. by S. of Newtownbarry, on the slope of Mount Leinster, rises the small river Clody, which forms the boundary of the county to Newtownbarry, where, after a rapid course, it falls into the Slaney. From Newtownbarry the boundary-line runs for a short distance up the course of the Slaney, after which it runs along the tributary river Derry to a point a little beyond the junction of the counties of Carlow, Wexford, and Wicklow. After leaving the course of the Derry, the boundary-line runs over an elevated ridge which forms the southern termination of the mountains of Wicklow, and which is little less elevated than that portion of the ridge which lies S.W. of the valley of the Slaney.

Besides the ridges which form part of the natural boundaries of the county, Wexford contains many single hills of considerable elevation, among which are the Forth Mountains, which extend 5 or 6 miles from the neighbourhood of Wexford towards the S.E. corner of the county. The principal river of the county is the Slaney, which enters from the county of Carlow a short distance north of Newtownbarry, and flows past that town and Enniscorthy to Wexford Harbour. It is navigable for large boats as far as Enniscorthy, to which place the tide flows. The Barrow is noticed under CARLOW. The other rivers are small.

Geologically considered, the county of Wexford forms part of the clay-slate tract which extends along the eastern portion of Ireland from the northern part of Wicklow to the Atlantic Ocean. The clay-slate is found in immediate contact with granite, which forms the chief component of the ranges that separate this county from Carlow. The Forth Mountains consist principally of quartz rock, with occasional laminæ of clay-slate. Granite appears about Carnsore Point and at a few other places, and greenstone and porphyry also occur.

In climate, those parts of Wexford which lie open to the sea are milder in temperature than the adjacent counties of Carlow and Kilkenny. Snow seldom remains on the ground in these districts, and agricultural operations may often be carried on without interruption, while lands ten miles inland are locked up with frost.

Soil, Agriculture, and Manufactures.—The soil of the county of Wexford is generally of a cold clayey nature, being deficient of the substrata of limestone and limestone-gravel which occur in the more inland counties; and, generally speaking, the western or inland parts of the county are inferior in quality to the eastern or maritime portions, although the former have an equivalent for the inferiority of soil in the abundance of turf or peat found in the interior, which affords fuel for burning lime, which is obtained from the neighbouring counties. The agriculture of Wexford is generally in a creditable state, considering the natural disadvantages of the soil. The crops consist of the various kinds of grain, of which barley is the principal, beans, tares, rape, turnips, and potatoes, the last being the staple crop, and that upon which most manuring is bestowed. Dairies are numerous, and much butter is exported.

The great extent of sea-coast and the numerous banks in the vicinity render the fisheries of Wexford very important to its population, many of whom are engaged in them. The coast presents very numerous creeks capable of accommodating open boats, and at most of these some fishermen are resident, but there are no harbours suitable for large vessels.

The manufactures of the county are of little importance. Woollen cloths, checks, and coarse linens are made, but on a small scale.

Divisions and Towns.—Wexford is divided into 8 baronies, one of which is subdivided into two parts. It is in the united diocese of Ossory, Ferns, and Leighlin. Wexford is the county-town, where the assizes are held. The county returns 2 members to parliament, and the boroughs of Wexford and New Ross return one each.

The following are the principal towns, with the population of each in 1841 :—

Enniscorthy, a market-town, 14 miles N. by W. from Wexford, is situated on both sides of the Slaney, at the head of tide navigation. Barges of considerable size come up from Wexford with coals, timber, &c., and return with agricultural produce. There are two quays. The more ancient and principal part of the town stands on the side of a steep hill, the houses rising irregularly above each other. The town is also steep on the other side of the river. It contains a court-house, market-house, union workhouse, church, Roman Catholic chapel, and meeting-houses for Quakers and Methodists. The centre of the town contains many respectable houses, but the suburbs consist of poor cabins. There is a strong old castle. Population of the town, 7016.

Ferns. [FERNS.]

Fethard, 16 miles S. from New Ross, is situated on a small inlet of the sea running up from Bannow Bay, and is the principal fishing station on the south coast of Wexford. The town consists principally of one wide street, and contains an ancient church. Population, 406.

Gorey, a market-town, 30 miles N. by E. from Wexford, consists chiefly of one street, nearly a mile long. It contains a court-house, Roman Catholic chapel, and union workhouse. Population, 3365.

New Ross, commonly called *Ross*, a market-town and parliamentary borough, 21 miles N. from Waterford, is situated on the E. side of the estuary of the Barrow, here a fine deep river, up which at high-water vessels of 500 tons burthen

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can sail to New Ross. The æstuary, which here contains the united waters of the Nore and Barrow, is called the Barrow, or River of Ross, till it reaches the top of Waterford Harbour, 10 miles below. A bridge connects New Ross with the village of Rossbercon on the W. bank of the river. The older parts of the town are seated on acclivities of the river-bank, and are very irregular. The modern parts occupy the strip of comparatively flat land by the side of the river; the streets are here tolerably regular, and the houses respectable. The town contains a court-house, 2 churches, a large Roman Catholic chapel, and 4 or 5 places of worship for dissenters. New Ross is governed by a mayor, recorder, and other officers, and sends one member to parliament. Population, 7548.

Newtownbarry, a market-town, 22 miles N.W. from Wexford, is situated on the S. bank of the river Clody, close to its confluence with the Slaney. A western suburb extends into the county of Carlow, with which Newtownbarry is connected by a wooden bridge over the Clody. There is also a stone bridge of seven arches over the Slaney. Population, 1437.

Wexford, the capital of the county, a municipal borough, and a parliamentary borough, in 52° 20′ N. lat., 6° 28′ W. long., 73 miles S. from Dublin, is situated on the S. side of the river Slaney at its entrance into Wexford Harbour. Wexford Harbour is large, and of very irregular form. The entrance is between the extremities of two long, narrow, sandy peninsulas, Raven Point on the N. and Roslare Point on the S., where it is less than a mile wide, but almost immediately expands to a width of more than 8 miles. The town of Wexford lies about 4 miles from the entrance of the harbour, which contracts so suddenly opposite the town, as to be crossed by a bridge 1571 feet long, a portion of the roadway of which is made moveable, to allow the passage of masted vessels into the inner portion of the harbour, which again extends, though only for a short distance, to the width of about two miles. A bank of shifting sand outside the entrance to the harbour has been for some years increasing, and it leaves so little depth of water as to render the entrance to the harbour inconvenient except for small vessels. Several remedial measures have been suggested, but none as yet acted upon. The town is generally well built; but the streets are narrow, partially and but indifferently paved. It is supplied with water partly by pipes, partly by wells, and partly by a public conduit in the corn-market. Spacious quays extend along the harbour the whole length of the town. Wexford is enclosed towards the land by a wall, which was repaired in 1804, at the expense of the corporation. The town contains 2 churches, 3 Roman Catholic chapels, 3 or 4 places of worship for dissenters, a county court-house, town-hall, theatre, union workhouse, and prison. The principal trade is by steamers with Liverpool. The parliamentary borough returns one member. Population, 11,252.

History and Antiquities.—According to Ptolemæus the greater part of the present county of Wexford was inhabited by the Menapii, whose chief town, Menapia, is supposed to have occupied the site of the present town of Wexford. Wexford was formed into a county by King John in 1210. In 1649 the whole county was reduced to subjection by Cromwell, who put the garrison of Wexford to the sword.

The county of Wexford, especially the southern part, abounds with antiquities of Danish, Saxon, and Norman origin, though comparatively few can be assigned to a period prior to the arrival of the English in the country. There are several tumuli, or raths. There are remains of monasteries at Wexford, Enniscorthy, Ferns, Dunbrody, near the confluence of the Suir and the Barrow, Ross, and Clonmines. Religious houses were also formerly existing at many other places where no traces now remain. Ruins of castellated buildings are numerous.

WEYMOUTH. [Dorsetshire.]

WHALE FISHERY. [Fisheries.]

WHALES, *Cetacea*, an order of aquatic mammals with fin-like anterior extremities, the posterior extremities being absent, or rather having their place supplied by a large horizontal caudal fin or tail; without an external ear, without hair on their external integument, and the cervical bones so compressed as to leave the animal without any outward appearance of a neck. This order comprises the largest animated forms in existence.

Cuvier divides the *Cetacea* into two families, viz. the *Herbivorous Cetacea* and the *Ordinary Cetacea*. The former family includes the Lamantins or Manatees (*Manatus*, Cuv.), the Dugongs (*Halicore*, Ill.), and the Stellères (*Rytina*, Ill.). The second family includes the Dolphins, Porpoises, Narwhals, Cachalots, Whalebone Whales, and Rorquals.

With respect to the Herbivorous Cetacea, they are now, by the consent of all zoologists, removed from the *Cetacea*, and placed under the order *Pachydermata*, of which, as their anatomy demonstrates, they form the aquatic section. They constitute the *Aquatic Gravigrades* of M. de Blainville. In these Aquatic Gravigrades the teeth are of different kinds. The molars have flattened crowns, corresponding to the vegetable nature of their food. The mammæ are two, and pectoral. The lips are provided with stiff bristles. The external nostrils are always two, situated at the extremity or upper part of the muzzle, which is obtuse.

In the *True Whales* the teeth are of one kind, or wanting; and where present not adapted for mastication. The mammæ are two, pudendal. The external nostrils are double or single, and situated on the top of the head.

The true Cetacea are endowed with the power of ejecting water forcibly from the nostril or nostrils, situated on the top of the head, and for this purpose a peculiar organisation is necessary. When the cetacean has taken into its mouth water which it wishes to eject, shutting its pharynx, it forces the water to ascend into the nasal passages, where certain annular fibres accelerate its progress till it raises a valve and distends two large membranous pouches above. The water, when once in the pouches, can be there retained till the animal

wishes to spout. When that wish is present, the cetacean closes the valve, and so prevents the descent of the water into the nasal passages, and forcibly compresses the pouches by means of the muscular expansion which overspreads them. The water, compelled then to escape by a narrow semilunar aperture above, is projected to a height which corresponds to the amount of the pressure applied. In the Dolphins the spout-hole is single; but in the Whalebone Whales it is double.

Reverting to the *Aquatic Pachyderms*, we may briefly notice the genera in succession.

Manatee, or *Lamantin*. Body oblong; molar teeth marked with two transversal elevations on their crown; no canines in the adult; vestiges of nails on the edges of their anterior extremities or pectoral fins; pectoral mammæ; skin very thick and naked; whiskers very strong and close set; horizontal tail thick, tegumentary, and elongated oval.

$$\text{Incisors, } \frac{2}{0}\text{; molars, } \frac{8-8}{8-8} = 34.$$

The mammæ of the Manatees and Dugongs are pectoral; and this conformation, joined to the adroit use of their flippers (whose five fingers can be easily distinguished through the investing membranes, four of them being terminated by nails) in progression, nursing their young, &c., have caused them, when seen at a distance with the anterior part of their body out of the water, to be taken for some creature approaching to human shape. One species is peculiar to the seas and mouths of rivers in the warmer regions of America. Another species inhabits similar localities on the coast of Western Africa.

The *American Manatee* (*M. Americanus*) reaches 20 feet in length, and is the *Vache Marine* of the French, and *Sea-Cow* of the English.

The Manatees are gregarious, and generally go in troops. The young are usually placed in the centre of the herd for protection, and on the approach of danger, all unite for the common safety. They are so strongly attached to their young that if the young Manatee be taken the captors are sure of the mother, from the recklessness with which her maternal affection leads her to the place of capture. If the mother be captured, the young follow her to the shore and fall an easy prey.

The shallow bays of the Antilles and the quiet creeks of the South American rivers, particularly in Guiana and the Brazils, are the favourite haunts of the Manatee. They were formerly abundant at the mouths of the Orinoco and Amazon, ascending many miles, even into their tributaries and the fresh-water lakes. Their food is entirely vegetable, consisting principally of subaqueous plants and littoral herbs.

The mild inoffensive manners of the Manatee, and the unsuspecting nature of the animal, make it an easy prey to the hunter, who pursues it for the sake of the flesh, which all pronounce to be excellent both fresh and salted. Hernandez compares it to well-fatted pork of pleasant flavour. Others compare it, when roasted, to beef or veal in flavour, and state that when salted it makes excellent sea provision.

Halicore. Body elongated, tail-fin in form of a crescent, molars each composed of two cones united by the side, small-pointed tusks inserted in the incisive bones, skin very thick and without hairs. Two species are known—one (*H. Dugong*) being a native of the seas of Sumatra and the Indian Archipelago; the other (*H. Tabernaculi*) inhabiting the Red Sea.

In habits and manners these animals closely resemble the Manatee. They are gregarious, often appearing in the shallow water, assembled in flocks of upwards of a hundred together. Their flesh is delicate and highly prized. Length from 8 to 10 or 12 feet.

The female Dugong produces generally only one young at a birth, and to this the mother bears such strong affection that, if the young is speared, the mother will not depart, but is sure to be taken also.

The Dugong of the Red Sea was named *H. Tabernaculi* by Rüppell, under the impression that it was with the skin of this species that the Jews were directed to veil the Tabernacle. He saw it swimming among the coral banks on the Abyssinian coast near the Dalac Islands.

Rytina (*Stellerus*, Cuvier). A single molar tooth on each side, with a flat crown traversed by bands of enamel. Flippers destitute of nails. One species only is known, the *Maskaia* (*Rytina Stelleri*), from the northern latitudes of the Pacific Ocean.

We now turn to the *true Cetacea*, the Grampuses and Whales.

Family, *Delphinidæ*.

Phocæna. Muzzle short, convex, and not terminated in a rostrum. Teeth numerous, placed irregularly in each jaw. A dorsal fin.

$$\text{Molars, } \frac{40 \text{ to } 46}{40 \text{ to } 46} = 80 \text{ to } 90.$$

Example.—The Porpoise or Porpesse (*Delphinus Phocæna*, Linn.). Upper part of the body deep bluish or greenish black fading on the sides into the polished silvery whiteness of the belly. The brownish flippers rise from a white ground. Length from four to five feet. It inhabits the Atlantic Ocean and the seas of Europe.

This appears to be the φώκαινα (*phocæna*) of Aristotle ('Hist. An.,' vi. 12). It is the *Porco Pesce* of the Italians (whence probably the English name *Porpesse*); *Marsouin* of the French; and *Meerschwein* of the Germans.

Porpesses swim in shoals, and drive the mackerel, herrings, and salmon before them, pursuing them up the bays 'with the same eagerness,' says Pennant, 'as a pack of dogs does a hare. In some places they almost darken the sea as they rise above water to take breath: they not only seek for their prey near the surface, but often descend to the bottom in search of sand-eels and sea-worms, which they root out of the sand with their noses in the same manner as the hogs do in the field for their food.' In fine weather they leap, roll, and tumble in the manner so well known, principally in the spring and summer, which is supposed to be their rutting season. They go up the rivers in pursuit of the salmon, to which they are a deadly enemy, and other

fish; and have been seen high in the Loire, Charente, and Seine, in France.

The oil produced from the fat surrounding the body is very pure. The skin, when properly tanned and dressed, is used for wearing apparel and for coverings for carriages.

Delphinopterus. Head obtuse. Muzzle short and conical, or terminated in an elongated rostrum. Number of teeth variable. No dorsal fin.

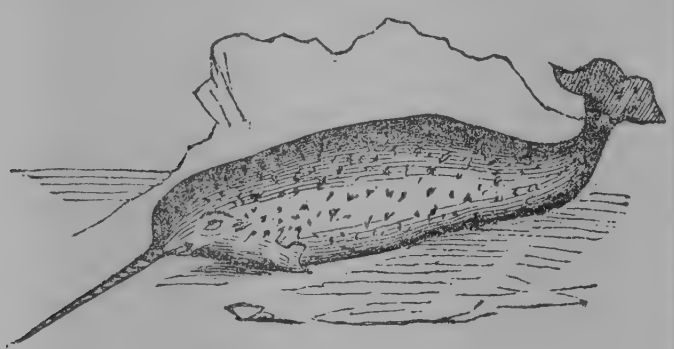
Example.—The *Beluga*, or White Whale; the White Fish of the whalers (*Delphinopterus leucas*). Length from 12 to 18 feet. Locality, Northern Ocean. Gregarious in herds of 40 or 50. The *Beluga* feeds on cod, haddock, flounders, &c.

Monodon. Body elongated; a slight longitudinal projection or crest in place of the dorsal fin.

$$\text{Canines, } \frac{1-1}{0}\text{; molars, 0.}$$

Example.—The *Narwhal* (*Monoda monoceros*). Locality, the Northern Ocean. This is the *Naarwal* of the Germans; *Narval, Unicorne*, and *Licorne de Mer*, of the French. *Unicorn Whale* of the English.

Although the Narwhal has in reality two projecting tusks, one only, having a spiral twist, is generally developed, the other remaining concealed within the socket. This however is not always the case. The mouth is small, destitute of molars, and surrounded by stiff lips. The length is 15 or 16 feet, exclusive of the tusk.



Narwhal (*Monoda monoceros*).

Narwhals swim with great swiftness. When at the surface for respiration, they blow repeatedly with considerable force, and then frequently lie motionless for several minutes with their back and head just above water. Mr. Scoresby describes them as often sporting about his ship, sometimes in bands of fifteen or twenty together, often elevating their long tusks, and crossing them with each other as if they were fencing.

The blubber of the Narwhal yields a very superior oil, which, as well as the flesh, is considered a dainty by the Greenlander, who kills it with harpoons, &c., in fissures of the ice, where it comes up to respire. The ivory of the tusk is considered superior to that of the elephant: it is very dense and hard, very white, is not subject to become yellow, and is susceptible of a high polish.

Family *Physeteridæ*.

Physeter.—Length of the head equal to a third or half the total length. Upper jaw large, elevated, and either without teeth or furnished with very few, which are short, and nearly entirely hidden by the gum; lower jaw narrow, and armed with stout conical teeth. Orifices of the blow-holes united, and situated at the end of the upper part of the muzzle. No dorsal fin.

Example.—The *Cachalot* or *Sperm-Whale* (*Physeter macrocephalus*). For a full account of the Cachalot see Mr. Beale's work on the 'Natural History of the Sperm-Whale,' in which its habits and structure are minutely detailed.

The range of the Cachalot is very extensive. The species has been seen in almost all seas; but it is now principally found in the Southern Ocean, on the coasts of America, Japan, New Guinea, Timor, &c. The head of the Cachalot presents a very thick blunt extremity. At its junction with the body is a large protuberance on the back called 'the bunch of the neck;' immediately behind this is the thickest part of the body, which thence gradually tapers off to the tail, where there is another large prominence called 'the hump,' from which a series of smaller processes run half way down the 'small' or tail. The body then contracts so much as to become finally not thicker than that of a man, and terminates by expanding on the sides into the 'flukes,' which form a large triangular horizontal fin, about 6 or 8 feet in length, and from 12 to 14 in breadth, in the largest males. The slit of the single blowing-hole or nostril is about 12 inches in length. In the right side of the nose is the 'case,' a cavity for the purpose of secreting and containing an oily fluid, which after death concretes into a granulated yellowish substance: this is the *Spermaceti*. In the case of a large whale there is not unfrequently a ton, or more than ten barrels, of spermaceti. Beneath the case and nostril is the elastic 'junk,' formed of dense cellular tissue strengthened by strong tendinous fibres, and infiltrated with very fine sperm oil and spermaceti. The mouth extends nearly the whole length of the head. Both jaws are furnished with tolerably well-developed lips. The tongue is small and white. The throat is capacious enough to give passage to the body of a man, presenting a strong contrast to the contracted gullet of the Greenland Whale. The eyes are small in proportion to the size of the animal, and are furnished with eyelids. Not far from the posterior angle of the mouth are the swimming-paws or fins, which are not much used in progression, but probably more as balances, and occasionally in supporting the young. A sperm whale of the largest size is about 84 feet in length. The skin is smooth, but occasionally in old whales wrinkled. The general colour is very dark, deepest on the upper part of the head, back, and flukes, in which situation it is sometimes black; on the sides it gradually assumes a lighter tint, and on the breast becomes silvery gray. Immediately beneath the black skin is the blubber or fat, of a light yellowish colour, producing when melted the sperm oil. A large whale will yield 80 barrels of oil, and sometimes 100 barrels.

As the bulk of the head consists of a membranous case containing thin oil, it is specifically lighter than any other part of the body, and a slight effort would suffice to raise the whole flat surface of the nose out of the water. Respiration is effected at very regular intervals, when the snout emerges, and from the extremity of the nose the spout is

thrown up. It is formed of the expired air forcibly ejected through the blow-hole, and acquires a white colour from minute particles of water previously lodged in the chink or fissure of the nostril, and also from the condensation of the aqueous vapour thrown off by the lungs. The spout, says Mr. Beale, is projected at an angle of 136° in a slow and continuous manner for about three minutes, and may be seen from the mast-head in favourable weather at the distance of 4 or 5 miles. Immediately after each spout the nose sinks beneath the water, scarcely a second intervening for the act of inspiration, the air rushing into the chest with great velocity. There is however no sound caused by inspiration, and very little by expiration in this species. Ten seconds is occupied by a large sperm whale in making one inspiration and one expiration. At each breathing time the whale makes from sixty to seventy expirations, and remains at the surface ten or eleven minutes. When the breathing-time is over, the head sinks slowly, the 'small,' or the part between the 'hump' and 'flukes,' appears above the water curved; the flukes are lifted high into the air, and the animal having assumed a straight position, descends perpendicularly to an unknown depth. The whale continues thus hidden beneath the surface for about an hour and ten minutes.

Small fishes are occasionally swallowed in quantities by this whale; but the principal food appears to consist of cuttle-fishes. [SEPIADÆ.]

This species is gregarious; and the herds are of two kinds, one consisting of females, the other of young males not fully grown. Mr. Beale has seen as many as five or six hundred in one herd. With each female herd are from one to three large males. Mr. Beale states that the female is smaller than the male, and that she produces generally only one at a time, but sometimes two. Nothing certain appears to be known as to the period of gestation, but M. F. Cuvier supposes it to be ten months.

Family, *Balænidæ*.

In the members of this family the head is not so convex as that of the Cachalot. Both sides of the upper jaw within the mouth are furnished with transverse plates of a fibrous horny substance, which is the *Baleen* or *Whalebone*. The lower jaw is entirely unarmed.

Balæna. No dorsal fin; but in some species there is a dorsal boss, or hump.

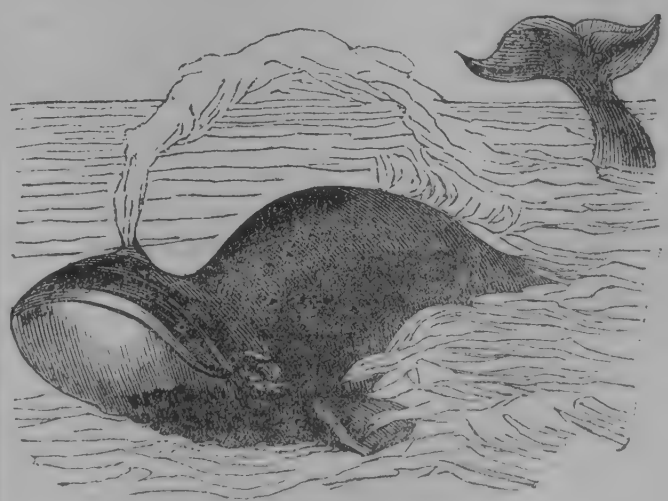
Example.—The *Mysticete* or *Greenland Whale* (*Balæna mysticetus*).

Cuvier observes that in the genus *Balæna* 'the upper jaw, in the form of a boat's keel reversed, has its two sides furnished with transverse, thin, and closely set laminæ, termed baleen plates, formed of a sort of fibrous horn, with unravelled or filamentous edges, which serve to retain the small animals on which these enormous cetaceans subsist. Their lower jaw, sustained by two osseous branches, arched outwards and upwards, without any teeth, lodges a fleshy tongue, very thick; and envelops, when the mouth is closed, all the internal part of the upper jaw, and the horny laminæ with which it is clothed.'

The *Common Whale, Greenland Whale,* or *Great Mysticete,* appears to be the Μυστίκητος of Aristotle ('Hist. Anim.,' iii. 12).

The habitat usually assigned to this whale is very extensive. M. Lesson states that it inhabits all the seas of the globe, especially the two poles; but it is not improbable that the Whalebone Whale, or Black Whale, of the South Seas, *Balæna Australis,* Desmoulins, has been mistaken for the Greenland Whale.

The colour of the Greenland Whale is black on the back, greater portion of the upper jaw, part of the lower, fins, and tail. Lips, fore part of lower jaw, and a portion of the abdomen, white. Eyelids, junction of the tail with the body, part of the axilla of the flippers, &c., gray. The older the whale, the more white and gray is there upon it. Some are piebald all over. The surface of the body is rather furrowed. The head is very large, forming nearly a third of the whole bulk, the under part, the outline of which is given by the jaw-bone, flat. The upper jaw is bent down at its edges like a boat upside down, so as to shut in the cavity of the mouth. On the most elevated part of the head are situated the blow-holes, two longitudinal apertures from eight to twelve inches long. There are upwards of three hundred plates of whalebone on each side of the jaw, enclosing the tongue between their lower extremities, and themselves covered by the lower lip. The body is thickest a little behind the flippers, near the middle of its whole length, whence it gradually tapers conically towards the tail, and slightly towards the head. There is no dorsal fin. The flippers, about 9 feet long and 5 broad, are placed about 2 feet behind the angle of the mouth, and cannot be raised above a horizontal position. The horizontal tail is flat and semilunar, indented in the middle. The eyes, not much larger than those of an ox, have a white iris. The sense of sight appears to be acute in the water, but not out of it. The size of this whale when full grown is from 65 to 75 feet.



Greenland Whale (*Balæna mysticetus*).

This species seems to hear acutely any noise made in the water, such as splashing, &c., in calm weather; but a sound produced in the air, a loud shout for instance, when the whale is only at the distance of a ship's length, is disregarded. The usual rate of swimming seldom exceeds four miles an hour, but they will descend when har-

pooned at a velocity of seven or eight miles an hour. The Mysticete seldom remains at the surface to breathe longer than two minutes, during which period it blows eight or nine times. It then descends for five or ten minutes; sometimes, when on its feed, for fifteen or twenty minutes. In blowing it makes a loud noise. The spout is ejected some yards high, and has the appearance of a puff of smoke at a distance. They blow strongest, densest, and loudest, when alarmed, or after a long stay under water.

A very considerable portion of the feeding grounds is occupied by what is termed 'green water,' which swarms with minute life, and has been carefully examined and described by Mr. Scoresby. The smallness of the gullet is only fitted for swallowing small animals, such as the *Clio borealis*. This small mollusk is said to constitute the chief support of the Mysticete, and the structure and disposition of the whalebone plates explain how these or any other small species of animal are retained in the capacious mouth of their devourer, while the water taken in along with them drains through the interstices of the plates. When the Mysticete feeds, it swims rapidly below the surface with open jaws; a stream of water enters them, and with it myriads of small marine animals; the water finds an outlet at the sides, but the thick internal hairy apparatus of the whalebone does not permit one of those animals to escape.

Nine or ten months is supposed to be the period of utero-gestation, and the mother is so strongly attached to her young one, that it is often struck as a snare to the parent, for she will not leave it, and falls a victim to her maternal love.

This species is generally found alone or in pairs, excepting when many individuals are attracted to some abundant feeding ground.

To the Esquimaux and the Greenlander this species is all in all. They eat the flesh and fat with indescribable relish. The membranes of the abdomen serve them for clothing, and the thin transparent peritoneum admits light through the windows of their huts, whilst it keeps out the weather. The bones are made into props for their tents, or aid in the formation of their boats, and supply them with harpoons and spears for the capture of the narwhal, the seal, and greater sea-birds. The sinews divided into filaments are used as thread for sewing their dress, &c. To civilised nations, the oil made from its fat or blubber, and the whalebone, have long made it a great commercial object.

The history of the *Balænopteræ*, or *Rorquals*, some of which grow to 80 or 100 feet in length, may be found in the works of Lacépède, and of Baron Cuvier and M. F. Cuvier.

Fossil Cetaceans.

The fossil remains of cetaceans have hitherto been found in the tertiary formations only. Dr. Buckland, in his 'Bridgewater Treatise,' remarks that the seas of the Miocene and Pliocene periods were inhabited by marine Mammalia, consisting of Whales, Dolphins, Seals, Walruses, and the Lamantin or Manatee.

WHARF, a place constructed or set apart for the loading and unloading of goods. In this sense the word includes the quays of all sea-ports at which goods are required to be shipped or landed by 1 Eliz., c. 11 (now repealed) and subsequent acts. The sea-beach, or natural ground on the banks of a river or canal, is not a wharf. Wharfs in docks and similar situations are made legal by special acts of parliament, as the London Docks, &c., and there are some places which are deemed wharfs from immemorial usage. For the use of a wharf certain rates are usually charged, which are called *wharfage*, and the act 22 Car. II., c. 11, allows any one to load or unload goods on paying wharfage at the rates appointed. The wharfs of the port of London were established in 1558, in the first year of the reign of Queen Elizabeth. Several *sufferance wharfs* have been since added to these, under the authority of the commissioners of customs, and other sufferance wharfs are occasionally authorised for the landing and keeping of goods by the custom-house till the duties are paid or the goods bonded.

No goods except diamonds and bullion, fresh fish of British taking, and turbots and lobsters fresh, however taken or imported, are allowed to be unshipped from any ship arriving from foreign parts beyond seas, or landed or put on shore, except at legal quays appointed by her majesty for landing of goods, or at some wharf appointed by the commissioners of customs. Goods entitled to drawback or bounty are only to be shipped in Great Britain by wharfingers appointed by the commissioners of customs.

WHARTON, THOMAS WHARTON, MARQUESS OF, eldest son of Philip, Lord Wharton, was born about 1640. He entered parliament in the reign of Charles II.; and he adhered to the Whig party. On the landing of the Prince of Orange at Torbay, he and his father were among the first who joined him. He was made comptroller of the household, and sworn of the privy council. In 1696 he succeeded to his father's title, and in 1697 he was appointed lord lieutenant of Oxfordshire, and one of the chief justices in eyre. On the accession of Anne he was removed from his places by the Tory ministry, but on the return of the Whigs to power, he was appointed one of the commissioners for arranging the treaty of union with Scotland, and in Dec., 1706, was created Viscount Winchendon and Earl of Wharton. In 1708 he became lord lieutenant of Ireland, and he held that post till 1710. In Sept., 1714, after the arrival of George I., he was made lord privy seal, and on Jan. 1, 1715, he was created Marquess of Wharton and Malmsbury in the peerage of England, and Baron Trim, Earl of Rathfarnham, and Marquess of Catherlogh in that of Ireland. He died April 12, 1715.

WHARTON, PHILIP WHARTON, DUKE OF, the son of Thomas, Marquess of Wharton, was born in December, 1698. He was carefully educated, and showed quickness of mind, but was wayward and eccentric. His first folly was getting married clandestinely at the Fleet, London, when he was scarcely 16, to the daughter of Major-General Holmes, from whom he appears to have parted soon afterwards. In the beginning of

1716 the Marquess was sent abroad with a French Huguenot governor to be educated in Presbyterian principles at Geneva. The Geneva discipline proved intolerable, and, after a brief space, he left his governor behind, and set out post for Lyon, where he arrived Oct. 13, 1716. He then wrote a letter to the Pretender at Avignon, which he forwarded with the present of a valuable horse. The Pretender sent for him to his court, and from him Wharton it is said accepted the title of Duke of Northumberland. After this he presented himself in Paris, where he visited the widow of James II. at St. Germain, without however declining the attentions of the English ambassador, Lord Stair, at whose table he repeatedly dined.

Soon after his return to England he set out for Ireland, where he took his seat in the House of Peers, being then in his 18th or 19th year, and while yet under age, Jan. 20, 1718, he was created Duke of Wharton.

It was probably not till after he had attained his majority, early in 1720, that he took his seat in the English House of Peers. Up to this time he appears to have supported the ministry; but he now joined the opposition to the government measure of the South Sea Bill. His next appearance was as an opponent of the bill of pains and penalties against Atterbury. Wharton's affairs had by this time become greatly involved; his estates were sequestrated, and he was allowed only 1200*l.* per annum. He now set up a twice-a-week political paper, under the title of 'The True Briton,' the first number of which appeared June 3, 1723; the last, Feb. 17, 1724. At the same time he exerted all his influence in every other way against the ministry and the court. In 1724 he went to the Continent, and from this time his conduct was marked by a reckless disregard of consequences which resembled madness. He went to Vienna, and then to Spain, where he turned Roman Catholic, married a second wife, became an officer in the Spanish service, and exhibited some foolish bravados at the siege of Gibraltar. He afterwards joined the Pretender, and publicly assumed the title of Duke of Northumberland. In the meantime he was indicted in England, and was convicted of high-treason, by which he forfeited his titles and whatever property remained to him. After this he suffered much from poverty. He wandered from France to Spain, and from Spain to France, till he died in a convent of Bernardines, near Tarragona, May 31, 1731.

WHEAT. The species and varieties of Wheat are mentioned in the article TRITICUM. There are however three principal kinds, so different in appearance that they claim peculiar attention. These are the Hard Wheats, the Soft Wheats, and the Polish Wheats. The hard wheats are the produce of warm climates, such as Italy, Sicily, and Barbary. The soft wheats grow in the northern parts of Europe as in Belgium, England, Denmark, and Sweden. The Polish wheats grow in the country from which they derive their name, and are also hard wheats. It is from their external form that they are distinguished from other wheats. The hard wheats have a compact seed nearly transparent, which, when bitten through, breaks short, and shows a very white flour within. The soft wheats are those usually cultivated in Britain; they have an opaque coat or skin, which, when first reaped, gives way readily to the pressure of the finger and thumb. These wheats require to be well dried and hardened before they can be conveniently ground into flour. The Polish wheat has a long chaff which is much longer than the seed, a large oblong hard seed, and an ear cylindrical in appearance. It is a delicate spring wheat, and not very productive in the climate of England.

The hard wheats contain much more gluten than the soft wheats. It is this quantity of gluten which causes the Italian wheats to be used exclusively for the pastes which form so large a portion of the food of that nation. [VERMICELLI.] The soft wheats contain the greatest quantity of starch, which fits them for the vinous fermentation, by its conversion into sugar and alcohol: for brewing or distilling, therefore, the soft wheats are the best.

The distinction between the winter and summer wheats is one which arises entirely from the season in which they have been usually sown; for they can readily be converted into each other, by sowing earlier or later, and gradually accelerating or retarding their growths. The difference in colour between red and white wheats is owing chiefly to the soil; white wheats gradually become darker and ultimately red in some stiff wet soils, and the red wheats lose their colour and become first yellow and then white on rich, light, and mellow soils.

The soil which is best adapted to the growth of wheat is a deep loam inclined to clay, with a dry subsoil. If this is not so naturally, it must be drained artificially, to ensure good crops of wheat. In such a soil, wheat may be sown every third year, with proper intermediate crops. Wheat requires a soil in which the organic matter is intimately mixed with the earthy ingredients; where it can have a firm hold by its roots, and can at the same time strike the fibres of them downwards as well as around, in search of food. When it meets with such a soil and is deposited at a proper depth, it vegetates slowly, pushing to the surface one cylindrical filament, while numerous fibres strike into the soil from the seed. These supply the plant with regular nourishment, and in due time a knot is formed at the surface of the soil, from which several roots and stems branch out. This is called the *tillering* of the wheat. The new roots near the surface soon become the chief source of nourishment, and in a rich compact soil, where there is room, numerous stems arise, forming a tuft, and each of these in time bears a large ear well filled with seeds; so that from a very moderate quantity of seed a great return is produced.

The repeal of the protective duties on wheat is mentioned in the article CORN-LAWS. The quantity of wheat imported in 1849 was 3,872,134 quarters; the quantity entered for home consumption was 4,509,626 quarters. The gross amount of duty received was 226,785*l.*

WHEATEAR, one of the English names for the *Saxicola œnanthe* of authors, *Motacilla œnanthe*, Linn., genus *Vitiflora* of Belon and Brisson. This is the *Moteux* and *Cul-Blanc* of the French; *Codo-Bianco* and *Culo-Bianco* of the Italians; *Steinschwatzer* and *Weisschwanz* of the Germans; *Fallow-Chat*, *White-Tail*, and *Wheatear* of the British.

Geographical Distribution.—Very wide. Lapland, Denmark, Sweden and Norway, Iceland, and Faroe Islands. In Europe it is abundant, particularly on the northern shores of the Mediterranean. In these islands, the Wheatear arrives about the middle of March, and the great body have left us about the end of September. They visit the Hebrides, Orkneys, and Shetland.

Habits, Food, &c.—Insects generally, which are captured on the wing, coleoptera and their larvæ, and worms, form the food of the Wheatear, which generally sits on the watch upon an elevated clod or stone.

The nest is framed of dried roots and feathers, rabbit's down, &c.; and the eggs, generally six in number, are pale blue. The bird manifests sometimes great precaution in selecting a place for it not easily to be detected. Old walls, gravel or chalk pits, are frequently the localities.

When the Wheatears begin to draw towards our southern counties previous to their departure, they soon fall victims to the eagerness with which they are sought as delicacies for the table. The shepherds and others form traps for them in the downs by cutting out pieces of turf, which are so placed as to leave a passage beneath, in which horse-hair nooses are set. The birds, when alarmed, run in, and are caught.

Besides the Wheatear here noticed, Mr. Gould describes and figures the following as European:—The Black Wheatear (*Saxicola cachinnans*, Temm.); the Pied Wheatear (*Saxicola leucomela*, Temm.); the Russet Wheatear (*Saxicola stapazina*, Temm.); and the Black-Eared Wheatear (*Saxicola aurita*, Temm.).

WHEEL AND AXLE is a machine consisting usually of a cylinder to which a wheel is firmly united, so that the mathematical axes of both are coincident.

A cylinder on the circumference of which are fixed exteriorly boards whose planes, if produced, would pass through the axis, and which (being turned by the force of running water, or by the weight of men in the act of stepping from one board to the next above it) is employed to raise a heavy body by means of a rope passing over a smaller cylinder on the same axis, is a simple machine of this kind: the same may be said of a hollow cylinder which, with its axle, is made to revolve by men or animals walking in the direction of its circumference, in its interior surface. The capstan, the windlass, and the helm-wheel of a ship are only so many different forms of the same class of machines. Frequently also the axle is made to carry a wheel with teeth on its circumference, in order that, by revolving, motion may be communicated to machinery: such are the wind-mills and water-mills which are employed for grinding corn.

When it is required to exhibit the mechanical properties of the wheel and axle, a weight representing the moving power is applied at one extremity of a string, which at the other extremity is attached to and passes round the circumference of the wheel; and a weight, representing the resistance to be overcome, is applied in like manner at one end of a string which passes round the axle or cylinder. From this disposition it is evident that the mechanical power of the wheel and axle is the same as that of a lever of the first kind; for, the thickness of the ropes and the weight and inertia of the materials being disregarded, since the moving power and the weight to be raised, or the resistance to be overcome, act perpendicularly to radii of the wheel and the axle respectively, the effect is the same as if those forces were applied perpendicularly at the extremities of a straight or bent lever, whose fulcrum is at the mathematical axis of the machine. Hence, in the case of equilibrium, the moving power is, to the resistance, as the radius of the axle is to that of the wheel. The wheel and axle has manifestly however a great advantage over the simple lever, since the weight may be raised to any height which is consistent with the lengths of the ropes.

If the ropes to which the weights are attached have sensible thicknesses, and it is thought proper to take those thicknesses into consideration, the ropes may be conceived to be reduced to their mathematical axes, and these to pass over the circumferences of the wheel and cylinder at distances equal to the semidiameters; hence, in the proportion just stated, the radii of the wheel and axle must be augmented respectively by the semidiameters of the ropes which pass over their circumferences.

It is easy to perceive that (as in the lever and other mechanical powers) the spaces described by the weights in a given time, when in motion, are to one another in the inverse ratio of those weights; for the spaces described are respectively equal to the lengths of the strings which pass over the circumferences of the wheel and axle in the given time; and these lengths are proportional to the circumferences, or radii, that is, inversely as the weights acting at the circumferences.

If two wheels and cylinders are connected together by a string, or by teeth in the circumferences, the ratio between the power and the resistance, in the case of equilibrium, may be determined by the same rule as would be employed if those weights were at the opposite extremities of a double lever of the first or second kind. The pressures on the supports of a wheel and axle, when the machine is at rest, and when in motion about its mathematical axis, are investigated in treatises of mechanics.

WHEELE'RA, a genus of plants belonging to the natural order *Leguminosæ*. There is only one species of this genus well made out, and this is a native of America. It is called American Ebony, and has the name *W. Ebenus*.

WHEELS. In machinery, wheels are generally used for transmitting motion, regulating velocity, converting one species of motion into another, reducing friction, or equalizing the effect

of forces applied in an intermittent or irregular manner.

The simplest mode of transmitting motion from one wheel to another is by causing their peripheries to revolve in contact and pressing them together, in order to prevent slipping, with a force proportionate to the amount of resistance to be overcome. If two wheels of equal size be mounted in such a way that their peripheries press against each other, rotatory motion given to one wheel will be communicated to the other without any change of velocity, but with a reversal of direction; and by adding more wheels to the series, a train of any length might be produced, in which the velocity of revolution would be the same throughout, while the direction would be alternately from left to right and from right to left.

Another mode of transmitting rotatory motion more effectually than by simple contact is by the use of endless bands or straps passing over the peripheries of the wheels which are intended to revolve together. By adapting the length of the strap, the motion may be communicated to a considerable distance, with much less noise, friction, and consequent wear and loss of power, than by an intermediate train of wheels. Straps or belts are much used in cotton-factories and other works in which moving-power has to be communicated to a great number of machines in different parts of a building, and they are preferred to cog-wheels in cases where sudden strains are liable to occur, because of the yielding character of the connection effected by them. Such straps were formerly made of leather; but caoutchouc and gutta-percha are now largely used.

In some cases, the resistance to be overcome may be so great that no practicable means would make a band take hold of the peripheries of the wheels with sufficient force to prevent slipping: and engineers then often use a kind of chain, whose links work on pegs in the peripheries of the wheels. Where it is desired to communicate motion from one source of power to many different machines, the object may be effected either by one long strap so arranged as to pass round all the drums to be driven (these being supposed to be all in one plane), or by a series of shorter straps, each of which passes over two drums only.

To convert rotatory motion into rectilinear, or rectilinear into rotatory, various forms of the rack and pinion are used. In its simplest form this contrivance is applied in raising sluice-gates, in lifting-jacks, and various other machines in which a fixed pinion or small toothed wheel is made to give motion to a straight toothed bar capable of moving in the direction of its length. The same apparatus will convert rectilinear into rotatory motion by applying the power to the rack, or straight bar, instead of to the wheel. A crank is also applied in various ways for converting rotatory motion into rectilinear, or rectilinear motion into rotatory. Of the *Excentric* and other wheels for producing rectilinear or irregular motion from a revolving axis, or for producing uniform rotation from an intermittent force, the varieties are numerous. An excentric wheel is one which, whatever be the figure of its periphery, has its axis removed from the centre; and the unequal movement thus produced, gives an alternating motion to a rod attached to the wheel.

The escapement-wheels of clocks and watches furnish types of another important class of wheels for modifying motion; and snail-wheels, pin-wheels, rachet-wheels, and fusee-wheels, are among the ingenious contrivances by which the rotatory motion of a wheel and axle may be made to set in motion a train of complicated machinery, or to regulate and vary motion at pleasure. Another class of wheels, called *Friction-Wheels* are intended to lessen the evils of friction in machinery. Friction rollers, which are generally of small diameter, are not necessarily fixed upon axles or shafts, but are interposed bodily between the rubbing or sliding surfaces, which press upon opposite sides of their peripheries; and they may be employed to alleviate friction between concentric circular surfaces, such as those of the axle and nave of a wheel, as well as between flat surfaces. In some arrangements of mechanism, friction-rollers are provided with small axles which do not bear any important strain, but are used chiefly for the purpose of keeping the rollers in their proper place.

Wheels introduced into machinery for the purpose of overcoming inertia, or of rendering uniform and steady a motion derived from an intermittent or variable source, are called *Fly-Wheels*. Since they owe their effect to their weight, fly-wheels are usually heavy, and as much as possible of their weight is disposed in the rim, where, owing to the effect of centrifugal force, it is of far more value than when near the centre. The steam-engine, the stamping-press, the common lathe, the coffee-mill, and a variety of other machines, exhibit the useful application of a fly-wheel. A fly-wheel will often in effect greatly increase the power of an engine to which it is applied, by affording the means of accumulating the power generated during several strokes, and giving it back at once when required to meet an extraordinary strain. In roasting-jacks, musical-boxes, the striking-apparatus of clocks, and various other contrivances in which a retarding force is required to prevent the moving power of a spring or weight from running down too rapidly, wheels with projecting vanes, which encounter sufficient resistance from the air to moderate their velocity, are used under the name of *Flys* or *Flyers*.

WHEELS, TEETH OF. The parts of a wheel between notches cut in its circumference, or the pegs inserted in its surface, for the purpose of enabling it to be turned on its axis by the rotation of another wheel having similar projections, are called the cogs or teeth of the wheel; and the determination of the form which their acting surfaces should have, in order that the rotation may be as steady and as uniform as possible, is a subject of considerable importance in practical mechanics. When the teeth of two wheels which act on one another are in the direction of the radii, and when the teeth of one wheel are in the direction of its radii, and those of the other are fixed perpendicular to the plane of the latter wheel, the two wheels will revolve in the same

plane, or in two parallel planes. Again, if the teeth of both are perpendicular to the planes of the wheels, it is evident that the wheels may revolve on axles at right angles to each other. This construction is even at present in use for some kinds of machinery. A small wheel having cylindrical staves or spindles fixed between two circular boards or plates of metal, in positions parallel to the axis of rotation, is called a lantern-wheel: and when a wheel acts with one which is smaller in diameter, whatever be the form of the teeth, the latter is usually called a pinion. Wheels having the teeth formed on their circumferences so as to project from thence in the direction of the radii are called spur-wheels: but when the teeth are perpendicular to the plane of the wheel, the latter is called a crown or contrate wheel. If the teeth are cut on the circumference of a wheel, in a direction oblique to its plane, the wheel is said to be bevilled; and two wheels may have their teeth so bevilled as to revolve in planes making any angles with one another.

The bad effects of the irregular shocks to which a toothed wheel badly constructed is liable are diminished by having the teeth in each wheel as numerous as possible; the number will however depend on the magnitude which each tooth must necessarily have in order that it may possess the requisite strength. When a wheel drives or gives a rotatory motion to a pinion, the ratio between the radii of both will depend upon the power or the velocity which may be required; but the disposition of the wheel and pinion should be such that the resultant of the pressures which they mutually exert against each other is the least possible, and the form of the teeth should be such that the moving power at the circumference of the wheel may bear a constant ratio to the resistance at the circumference of the pinion. The pressure on the supports of the axle of the wheel will be less when the wheel and pinion are in the same plane, than when they are perpendicular or inclined to each other; for in the first case the pressures are perpendicular to the axis, but in the other the obliquity of the action produces a considerable strain on the wheel: and when the same wheel drives two pinions, the most favourable positions for the pinions are those in which their axes are in the same plane as the axis of the wheel.

The centres of two wheels being given, about them imagine circles (called the pitch or primitive circles) to be described to touch one another exteriorly, their radii being determined by the proposed velocities or powers of the wheels, and imagine a point on the circumference of the smaller circle, at the place of contact, to be moved by the revolution of the larger; then the path described by that point will evidently be part of an epicycloid. Now if, where the point is, there be imagined to be inserted one of the cylindrical staves of a lantern so that the surface of the stave may pass through the point, and one side of the impelling tooth of the larger wheel have the form of the portion of the epicycloid, the pressure of the tooth against the surface of the stave at their line of contact will, by the nature of the curve, be always in the direction of a plane passing through the point of contact of the two circles. Thus the pressure is direct, or without any sliding movement, and consequently there is no friction at the place in which the stave and tooth are in contact.

The correct formation of epicycloidal teeth is perhaps seldom attempted in practice; the curve may however be easily traced by means of its equation, which may be seen in most treatises of the higher mathematics.

If it were required to turn a pinion by the revolution of a wheel, the teeth of both having like forms, and it were also required that the teeth of the wheel should commence acting on those of the pinion at the instant when the line of contact is in a plane passing through the centres of the wheel and pinion; it may be easily shown that, in order to produce uniform movement, the acting faces of the teeth should have the form of epicycloids, or rather the faces of the teeth on the greater wheel should be epicycloidal, and those of the teeth on the smaller wheel hypocycloidal: the latter may however be plane.

If it be intended that the teeth of the wheel shall begin to act on those of the pinion before the line of contact on the tooth arrives at the line joining the centres of the two primitive circles, and shall terminate when it comes to that line, the reasoning before used may be applied; it being necessary merely to make the faces of the teeth on the smaller wheel epicycloidal, and those of the teeth on the larger wheel hypocycloidal or plane.

The involutes of circles which were proposed by Dr. Robison for the form of teeth, have some advantages over the constructions above mentioned, inasmuch as a greater number of such teeth can be made to act at the same time, and thus the pressure on each is diminished. The pressures of the teeth in action against each other is always in a plane which is a common tangent to the two primitive circles.

In general the teeth of a wheel are made to act on the teeth of a pinion before the place of contact arrives at the line joining the centres of the circles, and to continue the action for some time after that arrival: in this case it is evident, from what has been before said, that in forming the teeth, the portions which are nearest to the circumferences of the wheels should be hypocycloidal or plane, and the remaining portions epicycloidal. This is the construction recommended by Buchanan in his 'Treatise on Mill Work.'

Since a straight line may be considered as part of the circumference of a circle whose radius is infinite, an epicycloid formed by a generating circle rolling on a straight line becomes a cycloid; and hence it is evident that if a piece of rectilinear rack-work be employed to give motion to a pinion its teeth should have their acting faces cut in the form of a cycloid, whether the teeth of the pinion be small cylindrical staves, or have plane faces tending to the axis; but in the former case, the radius of the generating circle should be equal to that of the pinion, and in the latter it should be equal to half that radius.

When a wheel is to turn another by means of teeth in the circumferences of both, and the planes of the two wheels are to make with each other

any given angle, the acting circumferences of the wheels must evidently be frustums of cones which have a common vertex at the point where the mathematical axes of the wheels would meet if produced; and the surfaces of the teeth of both wheels must be of conical forms, having the same point for their common vertex.

WHETSTONE, a smooth flat stone used for whetting or sharpening edged instruments by friction. Whetstones, of which a peculiar kind for sharpening razors are called *Hones*, are made of various kinds of hard close-grained stone, and are moistened, when in use, with either oil or water. The latter is preferred by some for giving a keener edge to cutting instruments; but as it allows closer contact between the stone and the metal, it does not appear so well adapted for producing a very smooth surface. The proper use of a whetstone involves a degree of skill and dexterity which can only be obtained by practice.

WHETSTONE, GEORGE, a voluminous writer of prose and verse, lived in the latter half of the 16th century. Both the place and time of his birth are unknown. He served abroad as a soldier, and was an eye-witness to the fall of Sir Philip Sydney at Zutphen; he was next an unsuccessful farmer; afterwards he sailed with Gilbert to Newfoundland; and, finally, returning to England, he appears to have been chiefly occupied during the remainder of his life in literary labour. He is now chiefly known as having been the author of the 'Promos and Cassandra,' which, having been printed in 1578, ranks as one of our earliest extant comedies.

WHIG. Different accounts are given of the origin of this word. Burnet gives one in his 'History of his Own Time' (i. 43), under the year 1648.

Whig has long been the name of the one of the two great political parties in the state; the other is *Tory*. The Whigs of the last century and a half are generally viewed as the representatives of the friends of reform, ever since the popular element became active in the legislature. The only way to form any notion of what a Whig is or is supposed to be, is by examining the policy and measures of those administrations which are considered to be Whig administrations, and by comparing with such policy or measures what the members of such administrations have said and done when they were in opposition and out of power.

WHINCHAT, *Saxicola Rubetra*, Auct., *Motacilla Rubetra*, Linn. This is the *Traquet* of the French; *Grosser Fliegenfanger* of the Germans; and *Stiaccino* of the Italians.

Geographical Distribution.—Norway, Sweden, temperate Russia, but not Siberia; all southern Europe to the Mediterranean shore. In the British Islands they are generally but not numerously diffused in the summer. They arrive here about the middle of April, and depart in autumn.

Habits, Food, &c.—The flight of the Whinchat is undulating, and it flits from bush to bush, perching on one of the topmost twigs. Furze commons are its favourite haunts. Worms, insects, small shell-mollusks, and slugs form its principal food, but it also eats berries. The nest resembles that of the Stonechat, and is formed of dry grass stalks and a little moss, the lining being finer bents or stalks. It is usually placed on the ground. The eggs are five or six in number. There are generally two broods, the first appearing towards the end of May. The song is very pleasing, and somewhat resembles that of the Goldfinch.

Whinchats become, like the Wheatear, very fat in August, and, though smaller, are equally delicate for the table.

WHIP-POOR-WILL, *Caprimulgus vociferus*, of authors. The *Whip-Poor-Will* is an American species of the *Caprimulgidæ*. It is of the size of a thrush.

Nuttall says that this species arrives in the Middle States about the close of April or beginning of May, proceeding in its vernal migration along the Atlantic States to the centre of Massachusetts. Dr. Richardson states, that he observed this bird on the northern shores of Lake Huron only, the 50th parallel being probably the limit of its range. It arrives in Pennsylvania about the middle of April. The elevated dry barrens of Kentucky are its favourite resorts, and it is very seldom heard in low marshy tracts of country.

Habits, Food, &c.—*Phalænæ* and other large nocturnal insects, beetles, grasshoppers, ants, &c., form the food of this night-jar. It lays two eggs, which are deposited about the second week in May in the Middle States, but considerably later in Massachusetts. There can hardly be said to be any nest, but the female selects some secluded spot in the forest.

Mr. Nuttall remarks that, in the lower part of the state of Delaware, he found these birds troublesomely abundant in the breeding season, so that the reiterated echoes of *whip-whip-poor-will, whip-peri-will*, issuing from several birds at the same time, occasioned such a confused vociferation, as, at first, to banish sleep. This call, he adds, is continued, except in moonlight nights, usually till midnight, when they cease until again aroused, for a while, at the commencement of the morning twilight. They pass the day in repose, retiring to the deepest and darkest woods.

Chuck-Will's-Widow, Caprimulgus Carolinensis, the *Carolina Goatsucker*, is another species, which is seldom seen to the north of Virginia, but in the interior up the banks of the Mississippi as far as the 38th degree. It arrives in Georgia and Louisiana about the middle of March, and in Virginia early in April. It retires from the United States probably to winter in some part of the tropical continent, about the middle of August.

Habits, Food, &c.—Flying low, and skimming a few feet above the surface of the ground, it settles on logs and fences, from which it pursues the flying moths and insects on which it feeds; sometimes sailing near the earth, it alights to pick up a beetle, or flutters round the trunk of a tree in search of any insect that may be crawling on the bark. Mr. Nuttall, who thus describes its mode of taking its prey, adds, that, like the species above described, it commences its singular

serenade of *Chuck-Will's-Widow* in the evening soon after sunset, continuing the cry with short interruptions for several hours, and renewing it towards morning till the opening dawn. The tones are slower, louder, and more full than those of the *Whip-Poor-Will*, and may be heard on a still evening for half-a-mile.

WHIRLING-MACHINE, an apparatus invented by Mr. Robins for the purpose of determining the resistance of the air against bodies moving with velocities less than those for which the resistance can be determined by the Ballistic Pendulum. [BALLISTIC PENDULUM.]

It consists of a brass cylinder, 2 inches diameter and about 6 inches long, which is fitted in a frame so as to be capable of turning freely with its axis in a vertical position between the base of the frame and a horizontal plate of wood or metal which is supported above the base by four small pillars. The axle of the cylinder, which is of steel, passes through that plate, and terminates about 4 inches above it. To this is attached horizontally, and immediately upon the plate, a thin arm of wood or metal about 4 feet long, and formed with a feather-edge on each side: to the extremity of this arm is affixed the object which is to be used in the experiment, and a wire proceeding from the top of the steel axle to the extremity of the arm serves to prevent the arm from bending by its weight.

A silk line made fast at one end to the surface of the cylinder is in part wound round the cylinder; the line then passes over a pulley fixed in a vertical position at the opposite extremity of the machine, and to its lower end is attached some given weight. The descent of the weight causes the cylinder, and consequently the object at the extremity of the arm, to revolve about the vertical axis during the experiment. The weight at the end of the line being acted on by gravity descends at first with an accelerated motion, and consequently the circular movement of the object at the extremity of the bar is also accelerated; but after a few revolutions the resistance of the air against the object becomes very nearly equal to the weight of the descending body, and from that time the descent of the weight and the revolving motion of the object become sensibly uniform. When this uniform or terminal velocity is obtained in any experiment, the descending weight evidently expresses the amount of the air's resistance together with the inertia of the machine.

WHIRLPOOL, a place in a river, or in the sea, where, in consequence of obstructions from banks, rocks, or islands, or the opposition of winds and currents, the waters acquire a revolving motion.

The agitation of the waters which is constantly observed near Messina, and which is usually designated the whirlpool of Charybdis, is now well known to be unaccompanied by any vortiginous motion by which vessels might be absorbed, and is rather an incessant undulation of the water. Spallanzani, who was rowed over the spot when the wind was light, experienced no danger, though the boat was much tossed by the waves. He was informed however that when the wind is high, the swelling of the waves is more violent and extensive, so that small vessels which are driven within the limits of the agitation may be sunk by the waves breaking over them, and large ones may be driven on the Italian shore, where they are sometimes wrecked on the rock of Scylla. The Maelstrom between the islands of Mosker and Warae on the coast of Norway appears to be of a similar nature.

The circular or spiral motion of the water, which constitutes a whirlpool or eddy in a river, is produced by flexures of the banks or contractions of the bed; in consequence of which the current, instead of continuing parallel to the general direction of the river, is turned obliquely towards the middle: the particles of water between this oblique current and the bank by which the waters from the upper part of the river are reflected, are acted upon by forces in different directions; and the centrifugal force resulting from the curvilinear motion causes the centres of the whirlpools to be on a lower level than the general surface of the water in the river.

WHIRLWIND is a violent movement of the atmosphere in a circular or spiral direction about an axis, the latter having at the same time, as is now generally believed, a progressive motion, rectilinear or curvilinear, on the surface of the land or sea.

The tornadoes of North America and the coasts of Africa, as well as the typhoons in the sea of China, have long been known as violent tempests in which the wind has a revolving motion about certain axes; but these terms are commonly applied to such storms as are of short duration and comparatively of small extent, the diameters of the vortices varying from a few hundred yards to one or two miles. It is now ascertained, by such evidence as leaves scarcely any doubt of the fact, that in all or most of the great storms which agitate the atmosphere the wind has a rotatory movement, and that the diameter of the circle within which the gyration is performed is sometimes equal in extent to several hundred miles.

Though the fact of a revolving motion of the air in great storms may now be considered as established, it must be admitted that the cause of the rotation is still in obscurity. The agency of electricity is frequently manifested in storms; but whatever may be the cause, currents of air are frequently, as at the changes of the monsoons in the East Indian seas, impelled obliquely against each other, and thus rotatory motions in the atmosphere may be produced, exactly as eddies or whirlpools are formed in currents of water.

Mr. Redfield, in his 'Observations on Storms,' in the 'Transactions of the American Philosophical Society,' 1841, offers an opinion that generally during a gale there is, in the lower part of the atmosphere, a spiral motion inclining downwards and towards the centre; and in the higher regions a like spiral motion inclining upwards and towards the exterior.

WHISKEY. [DISTILLATION; WINE AND SPIRIT TRADE.] The word whiskey is the Irish word *uisgue*, 'water.' The name which the Irish give to the distilled spirit is *uisgue beatha*, 'water of life.' Usquebaugh, the name of a cordial at

one time in request, is the same two words in a compound form.

WHISPERING PLACES are vaults or galleries in which the sound of words uttered with a low voice is augmented, so as to become audible at a considerable distance from the speaker.

When the air is agitated by any impulse, as the utterance of a word at some spot, the undulations extend spherically in every direction; but if the impulse is given at one of the extremities of a tube, it is evident that the undulations will be prevented from spreading laterally, and the whole effect, augmented in consequence of the condensation of the particles of air in the tube, will be experienced at the other end of the tube. A like effect takes place in a less degree when sound ascends from the bottom of a deep well, or when words are uttered at one extremity of a long corridor or passage in a building.

When the place is in the form of a dome, the undulations of the air, which are produced by a sound emitted near the concave surface, at any part of the base of the dome, are, by continual deflections from every part of the concave surface, transmitted to a point in the base diametrically opposite to that from whence the sound proceeded; and there the waves are concentrated, so as to cause the perception of a sound many times louder than that which was emitted.

The whispering gallery in St. Paul's Cathedral, London, is that which surrounds the base in the concave surface of the interior dome. Here a person speaking in a whisper near the surface of the vault is heard distinctly by a person also near the surface and at the opposite extremity of a diameter, persons in any other part not being able to hear the sound.

WHISTON, WILLIAM, was the son of Josiah Whiston, rector of Norton, in Leicestershire, and was born at that place, Dec. 9, 1667. The materials for his Life are mostly contained in his autobiography, published in 1749. He was educated by his father till the age of 17, and was then sent as a pupil to Mr. Antrobus, at Tamworth, whose daughter he afterwards married. At the age of 19 he was entered at Clare Hall, Cambridge, where he took his degree in Lent, 1689–90, was elected a fellow of his college in the following June, and received ordination in 1693. In 1694 he was made chaplain to Dr. More, bishop of Norwich. In 1696 he published his 'Theory of the Earth,' which went through six editions. In 1698 he got the living of Lowestoft in Suffolk, but resigned it on succeeding Newton in the Lucasian chair in 1703, when he settled at Cambridge. In 1702 he published an edition of Tacquet's Euclid, which was several times reprinted. He was fairly in the road to higher preferment, when a gradual change in his opinions took place, which ended in his becoming an Arian, and he finally added the rejection of infant baptism to his system. The change of his opinions soon appeared in his sermons and in his writings, which came out with great rapidity, and were very numerous.

In Oct. 1710 the storm burst upon him. He was banished from the University, and a year afterwards his professorship was declared vacant. Whiston was thus thrown upon the world, but he had a small patrimony, and with this, his writings, his public lectures, and the occasional liberality of those who admired his unflinching character, he never was in want. The lower house of convocation censured his writings in 1711. Whiston, nothing daunted, published his 'Primitive Christianity' in November, whereupon the lower house applied to the upper house for a censure, but without effect. In 1713 a private incumbent in London delated Whiston of heresy before the Dean's court of St. Paul's. The case was afterwards referred to a Court of Delegates appointed by the Chancellor; but this court refused to proceed without a court of adjuncts to determine what heresy was. The court of adjuncts ultimately refused to determine what constituted heresy; and so proceedings were delayed till 1715, when all heresy was pardoned by an act of grace. During the remainder of his life Whiston received no serious annoyance for his opinions, except that he was preached against and refused the communion by the clergy.

There are various circumstances of Whiston's life which it is not necessary to do more than name: his formation of a religious society, which met at his own house—his various philosophical lectures, oral and printed—his multifarious speculations on prophecy, particularly his decision that the Jews were to be restored and the millennium to commence in 1766; his speculations on finding the longitude; his plan for a survey of the coasts of England by subscription, which produced a useful chart, &c. He died Aug. 22, 1752, in London. The titles of Whiston's writings, up to 1737 only, are 59 in number. His translation of Josephus, published in 1737, is the only work which is now generally known.

WHITAKER, REV. JOHN, was born at Manchester about 1735, and studied at Oxford, where he took his degree of M.A. in 1759, and B.D. in 1767: he was also a fellow of Corpus Christi College. His first publication appears to have been the first volume, in 4to., of 'The History of Manchester,' which appeared in 1771, and which was followed by a second volume in 1775. Meanwhile also he had published, in an 8vo. volume, in 1772, his 'Genuine History of the Britons asserted,' in answer to James Macpherson's Introduction to the History of Great Britain and Ireland.' In 1778 Whitaker succeeded to the valuable rectory of Ruan-Langhorne in Cornwall. His principal publications after this were, an octavo volume of 'Sermons upon Death, Judgment, Heaven, and Hell,' in 1783; 'Mary Queen of Scots vindicated,' in 3 vols. 8vo.; Gibbon's 'History of the Decline and Fall of the Roman Empire Reviewed,' 8vo., Lond., 1791; 'The Origin of Arianism Disclosed,' 8vo., 1791; 'The Course of Hannibal over the Alps ascertained,' 2 vols. 8vo., 1794; 'The Antient Cathedral of Cornwall Historically Surveyed,' 2 vols. 4to., 1804; and 'The Life of St. Neot,' published in 1809, after his death. He died at his rectory Oct. 30, 1808.

WHITAKER, REV. THOMAS DUNHAM, LL.D., was born June 8, 1759, at Rainham in

Norfolk, where his father, who succeeded in 1760 to the family estate of Holme in Lancashire, was for some time curate. In 1775 he was sent to St. John's College, Cambridge; and in 1780 he proceeded LL.B.; but his father dying in 1782, he determined to enter the church. He was ordained deacon in 1785, and priest the next year. He became perpetual curate of Holme, in 1797. Having taken the degree of LL.D. in 1801, he was in 1809 presented to the vicarage of Whalley, and in 1818 to that of Blackburn. On being inducted into the latter living, he resigned the rectory of Heysham, which he had previously held along with Whalley. He died at Blackburn, Dec. 18, 1821.

Dr. Whitaker published a number of single sermons. The most important of his antiquarian works are the following:—'A History of the Original Parish of Whalley and Honour of Clitheroe,' 4to., 1801; 'History of the Deanery of Craven,' royal 4to., 1805; a new edition of Thoresby's 'Ducatus Leodinensis, or the Topography of Leeds,' fol., 1816; 'Loidis and Elmete, or an Attempt to illustrate the Districts described in these words by Bede,' 4to., 1816. To these is to be added a portion of an intended 'History of Yorkshire,' which has been published, in folio, since his death.

WHITBREAD, SAMUEL, the son of a wealthy brewer of the same name, by his wife Mary, third daughter of the first Earl of Cornwallis, was born in London in 1758. He inherited the brewery, and, by a clause in his father's will, he was compelled to retain a majority of the shares in his own hands. Great pains were taken with his education. He was sent to Eton, and removed thence to St. John's College, Cambridge. On leaving the University he made the tour of Europe. In 1789 he married Lady Elizabeth, eldest daughter of the first Earl Grey. He entered parliament in 1790, as representative of the borough of Steyning; and he continued a member of the House of Commons till his death, during the greater part of the time representing the town of Bedford. During the life of Mr. Fox he continued a zealous and personally-attached adherent of that statesman. After Mr. Fox's death Mr. Whitbread was one of the men of most influence in the ranks of the disorganised opposition. He asserted however a considerable degree of personal independence, and did not always act with his party. The most prominent event in Mr. Whitbread's parliamentary career was the impeachment of Lord Melville, which he conducted. He was a man of deep religious impressions; but there was nothing sectarian or gloomy in his religion, as may be inferred from the active part he took in the affairs of the Drury Lane Theatre. In private life he was amiable and irreproachable. Mr. Whitbread terminated his own life during a temporary aberration of intellect, July 6, 1815.

WHITBY. [YORKSHIRE.]

WHITCHURCH. [HAMPSHIRE; SHROPSHIRE.]

WHITE SEA, a large gulf of the Arctic Ocean, which enters deeply into the northern parts of European Russia, between 64° 30′ and 68° 30′ N. lat. The entrance to the White Sea is between Kanin Noss, on the island of Kaninskaia Zemlia, which lies to the east, and Swatoi Noss, a projecting cape of the peninsula of Kola on the west. These two places are about 100 miles distant from each other. The gulf gradually grows narrower, and where it turns to the south-west it is hardly more than 40 miles wide. That portion of it which lies E. and W. is nearly twice as wide, and expands towards the south into two large gulfs, the Gulf of the Dwina, and the Gulf of the Onega, named respectively from the rivers that fall into their most south-eastern recesses. West of the Gulf of Onega, the White Sea terminates in an inlet, which is about 100 miles long, has a mean width of 25 miles, and runs to the north-west. It is called Kandalaskaïa Guba, or the Gulf of Kandalask, from a small place of that name which lies near its innermost recess. The area of this sea is said to be about 44,000 square miles. The White Sea is so far favourable to navigation, that it has a considerable depth of water, with the exception of a sandbank which lies before the mouth of the Dwina. It is frequently covered with fogs, which are thick at a distance from the shore, but much less so as the coast is approached. The navigation generally lasts six months, as the ice in the Dwina begins to appear at the end of October, and before the beginning of May the river cannot safely be entered by vessels. Seals are very frequently met with on the shores. The white whale yields a valuable oil, and is met with in large shoals.

WHITE SWELLING, a disease of the joints, so called on account of the unaltered colour of the skin. Under this term are included nearly all those diseases of the joints which are the result of chronic inflammation in the bones, cartilages, or membranes constituting the joint. These inflammations are constantly attended with swelling, which is circumscribed; the part is sometimes hard, resisting the pressure of the fingers, and thus leading to the impression that the bone is swollen and diseased; or it may be elastic, and yielding to pressure; or so soft as to produce the impression of the presence of fluid. Sometimes these swellings are attended with no pain, at other times pain is one of the earliest symptoms, and is constantly present, and greatly aggravated by the motion of the limb. In some cases the motions of the joint are but little impeded, whilst in others they are entirely destroyed. These general symptoms however admit of distinction, and several forms of white swelling can now be traced to different parts of the joint as their seat. The following are the diseases of the joints which are generally denominated white swellings. 1, Inflammation of the Synovial Membranes; 2, Pulpy Thickening of the Synovial Membrane; 3, Ulceration of the Cartilages; 4, Scrofulous Disease of the Joints, beginning in the Bones. Each of these forms of disease requires its own appropriate treatment, and care must be taken not to confound one form with another.

WHITE, ROBERT, was born in London, in 1645. He learnt drawing and etching of David Loggan. He has engraved a large collection of

English portraits, many of which were drawn by himself from the life in lead-pencil upon vellum.

White was busily employed for forty years, and he had amassed about 5000*l.*; yet, says Walpole, by misfortune or waste he died indigent at last. Walpole has given a list of about 250 of White's portraits.

WHITE, GILBERT, was born at Selborne, July 18, 1720. He was admitted a student of Oriel College, Oxford, and took his degree of B.A. in 1743. He was elected a fellow of his college in 1744, became M.A. in 1746, and was made a senior proctor of the University in 1752. He retired at an early period of his life to his native village, in order to indulge his taste for literature and natural history; and there he died, June 20, 1793. The work on which the reputation of White as a naturalist rests is his 'Natural History of Selborne,' first published in 4to., in 1789. After the death of Gilbert White, Dr. Aikin published a work entitled 'A Naturalist's Calendar,' selected from a journal which had been kept by White for 25 years. In 1802 the 'Calendar' and 'Natural History' were published together. In 1813, another work by White, the 'Antiquities of Selborne,' the 'Natural History,' 'Calendar,' and some poems by White, were published together in 1 vol. 4to. From this time various editions of these works have appeared.

WHITE, HENRY KIRKE, was born at Nottingham, March 21, 1785. He was the son of a butcher of that place. He early showed a passion for reading, and at the age of 13 began to write verse. He had, in addition to writing and arithmetic, acquired an acquaintance with the French language. At the age of 14 he was taken from school, and placed at a stocking-loom, that he might learn the hosiery business. This however was abandoned, and after a year he was placed in an attorney's office at Nottingham. By the beginning of 1802 he had acquired, with very little instruction, a tolerable knowledge of Latin, and had begun Greek. To these languages he afterwards added Italian, Spanish, and Portuguese; chemistry, astronomy, and electricity also engaged his attention; drawing was another of his pursuits.

By his 15th year he had already begun to acquire distinction as a speaker in a literary society in Nottingham, and as a correspondent of various periodical publications, the 'Monthly Preceptor, or Juvenile Library,' the 'Monthly Magazine,' the 'Monthly Visitor,' and the 'Monthly Mirror.' The encouragement of the late Mr. Thomas Hill, the proprietor of the last-mentioned work, and of Mr. Capel Lofft, induced him, about the close of 1802, to prepare a volume of poems for the press. It was published in 1803, and dedicated, by permission, to the Duchess of Devonshire. This however gained the author nothing but the notice of Southey, to whom he is principally indebted for the preservation of his memory.

Before the publication of his first volume of poetry he had become deeply convinced of the truth of Christianity, and he tried to find the means of getting himself educated for the church. At last the matter was managed, principally by means of Mr. Simeon, of King's College, Cambridge, who procured him a sizarship at St. John's, with additional pecuniary assistance. He quitted his employers in Oct. 1804. He next read for a year with the Rev. Mr. Grainger, of Winteringham in Lincolnshire. During his first term one of the University scholarships became vacant, for which he was advised to offer himself as a candidate. He passed the whole term in preparation; but his strength and spirits sunk under his exertions, and when the day came he found himself compelled to decline being examined. He had now only a fortnight to prepare for the general college examination: in his exhausted and desponding condition he would have declined that too; but he was prevailed upon to come forward, and was pronounced the first man of his year.

He now paid a short visit to London. The next year, at Cambridge, he was again pronounced first at the college examination. The college then offered him a private tutor in mathematics during the long vacation; but relaxation, not stimulus, was what was wanted. He paid another visit to London, from which he returned to college only to die. His death took place Oct. 19, 1806, when he had just passed the middle of his 22nd year.

His papers were put into the hands of his friend Southey, who, in 1807, published a selection from his poems and prose compositions, in 2 vols., accompanied with a memoir. A supplementary volume, consisting of additional pieces, appeared in 1822; and both publications have since been incorporated, and in that form 'The Remains of Henry Kirke White' have been several times reprinted.

WHITEBAIT. Until Mr. Yarrell investigated the natural history of this very popular little fish, it was supposed to be the young of the shad. In the fourth volume of the 'Zoological Journal' that eminent naturalist published some valuable papers proving its distinctness as a species from any other member of the Herring genus *Clupea*, to which it belongs. The Whitebait is the *Clupea alba* of Yarrell, and is figured and described in the 'History of British Fishes.'

The Whitebait was first detected in Scotland by Dr. Richard Parnell, who gave an account of it in 1838, in his valuable 'Ichthyology of the Frith of Forth,' a prize essay of the Wernerian Natural History Society. He remarks, 'I have no doubt that the whitebait will be found to exist in the Frith of Forth throughout the whole year in considerable quantity, and that the fishermen would find it a new source of income equal or superior to the sperling fishery, did they use the mode of fishing for whitebait that is practised on the Thames.' He also detected the whitebait in great quantities in the Solway Frith, in the months of June and July, where however the daintiness of the morsel is unknown to the inhabitants of its shores. The principal food of the whitebait seems to be a species of shrimp.

Dr. Parnell has shown that the roof of the mouth and tongue of the whitebait are furnished with three or more rows of very minute teeth, a character which at once distinguishes it from the shad, which has those parts destitute of teeth.

WHITEFIELD, REV. GEORGE, the founder of one of the two great divisions of Methodism, was born Dec. 16, 1714, in the city of Gloucester. His father and mother kept an inn. His father died when he was two years old: but his mother did her best to bring him up creditably. By the time he was ten years of age he had formed the wish of entering the church.

He was placed at the grammar-school of St. Mary de Crypt in his native city, when he was about twelve, and here he made considerable progress in Latin. But this he abandoned in order to assist his mother in the inn, but his eldest brother having married, and taken the inn, his mother retired, and Whitefield went to live with her. It appears that neither mother nor son had given up an idea which he had early formed of yet making his way to the university; and some friends having been at last found to promise him a servitor's place at Oxford, he went back to school, where he now spared no pains to get forward; and he was admitted a servitor of Pembroke College in 1733. Before he had left school, the religious element in his character had been strongly developed, and after he had been about a year at college, he joined the Wesleys and their associates, and soon showed that he was to be outrun in zeal by none of them.

Whitefield was ordained deacon by Bishop Benson, of Gloucester, June 20, 1736. Soon after, he returned to Oxford, and took his degree of B.A. From the first his preaching made an extraordinary impression. He came up to London in 1737, to officiate for a time in the chapel of the Tower; but his first sermon in the metropolis was preached in Bishopsgate Church. He then officiated for a few months as curate at Dummer, in Hampshire. After a visit to Gloucester and Bristol, he set off to join the Wesleys in America, and embarked for Georgia Dec. 23, 1737, though it was not till the end of January following that the vessel got under weigh, about the very time that Wesley reached England on his return.

Whitefield remained in America till towards the close of the year. He then returned to England, mainly with the view of raising subscriptions for an orphan-house which he had established in Georgia. Now began that course of preaching in association with Wesley, which established Methodism as a popular faith. It was Whitefield who set the first example of preaching in the open air, Feb. 17, 1739, near Bristol.

From this time forward his life was spent in incessant movement from place to place, and in the exercise of his wonderful power of exciting and swaying the feelings of all orders of persons by his peculiar pulpit oratory. He repeatedly visited America, and traversed the whole extent of the British possessions there. When on this side of the Atlantic he generally made a yearly round through England and Scotland, and he was several times in Ireland. It was in 1748 that he became known to Selina, countess of Huntingdon, who made him one of her chaplains. This connection introduced him to the highest circles both of rank and literature in the metropolis.

Whitefield and Wesley were in various respects very unlike one another, and, as is well known, they did not long continue to co-operate. They quarrelled so early as in 1741, about the great question of predestination; Wesley declaring for the Arminian theology, and Whitefield advocating the Calvinistic system.

He was married in England, Nov. 11, 1740, to a widow. When his wife became pregnant, he announced publicly that the child would be a boy, and become a preacher of the gospel. He was right as to the sex, but the infant died at the end of four months. His wife died in 1768. Whitefield himself died at Newbury Port, near Boston, in America, Sept. 30, 1770.

Whitefield's printed works, besides an edition of Clarke's 'Commentary on the Bible,' which he published in 1759, consist principally of sermons and tracts, of a copious journal of his life and labours, and of three volumes of letters, extending over the time from July 18, 1734, to within a week of his death. A collection of his sermons, tracts, and letters, in 6 vols. 8vo., was published at London in 1771. His journals, like Wesley, he published in his own lifetime.

WHITEHAVEN. [CUMBERLAND.]

WHITEHEAD, PAUL, was the son of a tailor in London, where he was born Feb. 6, 1710. On leaving school he was placed as apprentice to a mercer in the city; but he found means to escape from this position, and to enter himself at one of the inns of court as a student of the law. It does not appear that he was ever called to the bar. In 1735 he married the only daughter of Sir Swinnerton Dyer, Bart., of Spain's Hall, Essex, with whom he received a fortune of ten thousand pounds. He published some poems, chiefly satirical, which gave the author some notoriety during his life, but are now forgotten. He died in London, Dec. 30, 1774. His collected works were published, in a 4to. volume, in 1777, with a memoir of his life.

WHITEHEAD, WILLIAM, was born in 1715, and died in 1788. He was the author of a volume of poems, now neglected, but of which two or three editions were printed, and they are included in 'Chalmers's English Poets.' They procured the author the post of poet-laureate, to which he succeeded on the death of Cibber. He also wrote two tragedies, a comedy, and a farce.

WHITETHROAT, *Motacilla Sylvia*, Linn.; *Sylvia cinerea*, of authors. This is the *Fauvette Grise* or *Grisette* of the French; *Macchetta* and *Sterpazzola* of the Italians; *Grasmücke* of the Germans; and *Peggy-White-Throat* of the British.

Geographical Distribution.—Denmark, Norway, Sweden, Russia, Siberia, Germany, Holland, France, Provence, Spain, Sardinia, Italy, Smyrna, Trebizond. A regular summer visitor to the British Islands, arriving about the third week in April, and departing in autumn.

Habits, Food, &c.—The principal food of the *Whitethroat* consists of insects. It is very fond of caterpillars, and is a considerable consumer of berries and smaller garden-fruits, such as raspberries, currants, &c., among which they and their young make much havoc in July and August.

A dwarf bush or a low tangled thicket of brambles, nettles, weeds, and rank grass, is generally selected for the nest. The eggs are four or five.

'Some of the notes of the voice of this bird,' says Mr. Yarrell, 'are rather harsh, others are pleasing, though too frequently repeated; but he always sings in earnest, erecting his crest, puffing out his throat, shaking his wings, jerking his tail, and making other movements which mark his agitation. Occasionally he sings on the wing, ascending with a peculiar flight, rapidly describing small circles, and after a few turns descending to the spot from which he arose.'

There is another Whitethroat, also a summer visitor to these islands. It is called the *Lesser Whitethroat*. It arrives and departs about the same time as the *Common Whitethroat*.

WHITGIFT, JOHN, ARCHBISHOP, the son of a merchant, was born at Great Grimsby in Lincolnshire in 1530. After studying for some years with his uncle, the abbot of a monastery of Black Canons at Wellow, a man strongly opposed to the abuses of the Roman Catholic Church, young Whitgift was sent to a school belonging to a religious house near Threadneedle Street, London. In 1548 he was sent to Cambridge, where he was entered at Queen's College, whence he removed to Pembroke Hall, which had a more Protestant character.

In 1554 he commenced B.A., and in the following year was elected fellow of Peter-House. On the accession of Queen Mary he found himself, with many other members of that university, in serious danger during the visitation in 1557. In this perilous year however he took his degree of M.A., and during the remainder of Queen Mary's reign continued his studies at the university, maintaining a cautious reserve as to his religious views. On the accession of Elizabeth, he entered into holy orders, and preached before the university, at St. Mary's. He continued his residence at Cambridge for upwards of fifteen years, holding many high offices and preferments. In 1567 he was chosen master of Pembroke Hall, but only remained in that situation for three months, being appointed chaplain to the Queen, and shortly afterwards master of Trinity College, Cambridge. In the same year also he took his degree of D.D., and became Regius Professor of Divinity. In 1568 the Bishop of Ely conferred upon him a prebend in his cathedral.

Meanwhile Dr. Whitgift drew up, with the vice-chancellor and some of the heads of colleges, a body of new statutes for the university. In 1571 he filled the office of vice-chancellor of the university, and in the following year was elected prolocutor of the Lower House of Convocation. At this time a book was published, called 'An Admonition to the Parliament,' being a violent attack upon the whole constitution of the Reformed Church, which Whitgift answered with great learning and skill. His labours in the controversy which followed, obtained for him the deanery of Lincoln from the Queen; and in 1576, he was promoted to be Bishop of Worcester. When Grindal, the archbishop of Canterbury, was suspended from his office by the Star Chamber, Elizabeth offered the archbishopric to Whitgift, which he however declined to accept during the life of Grindal. That prelate soon afterwards died, and in 1583 Whitgift succeeded him.

The Queen's zeal for orthodoxy was now at its height, and her new archbishop lost no time in proving his determination to enforce conformity. He immediately required all the clergy to subscribe to three articles before they were permitted to execute any ecclesiastical function, viz.:—1, That the Queen was the supreme head of the church; 2, That the Ordinal and Book of Common Prayer contained nothing contrary to the Word of God; and 3, That the Thirty-nine Articles were to be admitted as agreeable to the Holy Scriptures. Henceforward, his biography may be said to be the ecclesiastical history of England during the remainder of the reign of Queen Elizabeth. He did not live to assist in the consultations of the commission which was appointed by James I. to examine into the state of the church. He died in 1603.

WHITHORN. [WIGTONSHIRE.]

WHITING, the *Merlangus vulgaris* of Cuvier, *Gadus Merlangus* of Linnæus, a valuable fish on account of its delicacy and lightness as an article of food, in which properties it surpasses all the other fishes of its tribe. It is easily distinguished from the cod, haddock, and bib, by the absence of the barbule on the chin; and from the coal-fish, pollock, and green cod, by having the under jaw shorter than the upper, a black spot at the base of the first ray of the pectorals, and the tail even at the end. It abounds on all the British coasts, and comes in large shoals towards the shore in the months of January and February, for the purpose of depositing its spawn. It feeds on mollusca, worms, crustacea, and small fishes indiscriminately, and sometimes weighs several pounds, though usually it does not exceed one pound and a half.

WHITLOW is an inflammation affecting the phalanges of the fingers, and generally proceeding to suppuration. The part attacked however is not confined to the fingers; the same disease may also appear in the toes. *Paronychia* and *Onychia* are terms which are used to express the same disease. Surgical authors describe several forms of whitlow, or Paronychia, according to the textures which the inflammation attacks.

Whitlows may be caused by some external injury, such as a prick from a needle, pin, thorn, or other pointed object; or they may arise spontaneously, which is not unfrequently the case in young persons who are apparently in a good state of health.

In the treatment of whitlow the inflammation can rarely be subdued before it proceeds to suppuration. It may however be tried, and cold lotions and local bleeding, with general antiphlogistic treatment, will sometimes subdue the inflammation. When matter is formed, the best thing that can be done is to get rid of it as soon as possible, and this must be done by cutting down quite upon the seat of inflammation and pain.

WHITSTABLE. [KENT.]

WHITSUNTIDE is probably a contracted

form of White Sunday tide or time. In the early ages of Christianity the favourite seasons for administering the right of baptism were Easter Sunday, the anniversary of the resurrection of Christ, and Whitsunday, that of the Jewish feast of Pentecost, when the apostles were 'baptised with the Holy Ghost and with fire,' and they themselves commenced their public ministry by baptising three thousand persons. As emblematic of the spiritual purity which the rite of baptism is supposed to confer, those who received it were clothed in white, and the day is hence conjectured to have received its name of White Sunday (*Dominica alba*).

WHITTLESEA. [CAMBRIDGESHIRE.]

WIASMA. [SMOLENSK.]

WICK. [CAITHNESS.]

WICKLOW, a county in the province of Leinster, in Ireland, is bounded N. by the county of Dublin, N.W. and W. by Kildare, S.W. by Carlow, S. by Wexford, and E. by the Irish Channel. It lies between 52° 40′ and 53° 14′ N. lat., and 6° and 6° 47′ W. long. The greatest length N. to S. is 38 miles; the greatest breadth E. to W. is 33 miles. The area is 781 square miles. The population in 1841 was 126,148.

Coast, Surface, and Geology.—The northern part of the coast consists of low cliffs, which are succeeded by a steep shore, which is continued for about 18 miles to the stream which separates Wicklow from Wexford. The cliffs are of the clay-slate formation, which occupies the whole coast. The whole length of the coast may be estimated at about 36 miles. The only harbours are formed by the mouths of the rivers Dargle, Vartry, and Ovoca, and they are all unimportant.

The county of Wicklow is covered by the mountains which skirt on the south-east the great limestone plain of central Ireland. The mountains may be regarded as part of an extensive range crossing this part of Ireland in a S.S.W. direction from the coast about Dublin Bay to the junction of the Barrow and the Suir, near Waterford. The central part of the range consists of a mass of granite, which protrudes through the slate-rocks, the ends of which, though much shattered and confused, abut on each side against the mass of the granite. The slate-rocks occupy the rest of the county on each side of the granite, and form mountains of somewhat less elevation on its flank, extending from the central part of the range on the one hand towards the sea, and on the other towards the great central limestone plain, no part of which is in this county. Indeed, Wicklow is the only county of Ireland in which neither primary nor secondary limestone is to be found. It is altogether occupied by crystalline or schistose rocks.

The eastern flank of the Wicklow mountains presents a varied aspect, being worn into deep glens and dells, which are lined with abrupt precipices or occupied by lakes, from whence begin those narrow transverse valleys whose general course to the S.E. is distinguished by the most beautiful and romantic scenery. The western flank, on the other hand, presents less variety: the glens and valleys, which exhibit fewer features of attraction, being more rounded and expanded. The rivers which arise in these have a general tendency towards a N.W. direction; but on both sides of the central range the transverse valleys either merge into or cut across more expanded longitudinal vales by which the central range is flanked, and beyond which arise offsets or detached groups and parallel ranges of lower hills. The general height of the Wicklow Mountains is from 1000 to 2000 feet. Table-Mountain, near the head of the Slaney, is 2302 feet high. Lugnaquillia, near the source of the Little Slaney, 3039 feet, is the highest mountain in the county.

The rocks on the eastern flank of the granite abound in metals, while on the western flank there is a total absence of them. Galena, green and white lead ore, and copper pyrites are found in the granitic district. The ore is smelted in small blast-furnaces, with the aid of turf, lime, and a small portion of the purest blind-coal. In the clay-slate tract are found gold, silver, copper, iron, lead, zinc, tin, tungsten, manganese, arsenic, and antimony. The metalliferous portion of the clay-slate district is small, extending in length only from the border of the county, at Croaghan Kinshela, 10 or 11 miles in a N.N.E. direction, and having but a small breadth. The discovery of native gold near Croaghan Kinshela Mountain took place about 1796, and many hundred people assembled daily to search for it in the bed and on the banks of the Ballinvalley, or Goldmine River, a stream which rises in the mountain, and joins the Daragh just above its junction with the Ovoca. Government took up the matter, and regular stream-works were established, but they were destroyed in the insurrection of 1798. They were resumed in 1801, with the addition of works for the discovery of auriferous veins; but the search was unsuccessful, and the whole of the works were abandoned.

Rivers.—The central mountain-range divides the county into two slopes, the eastern and the western. The eastern slope is drained by the Dargle (12 miles long), the Vartry (18 miles long), the Three Mile Water (6 miles long), the Potter's River (7 miles long), and the Ovoca. The western slope is drained by the Liffey and the Slaney, with their respective affluents. These two last-mentioned rivers, although draining the western slope, afterwards turn eastward, and passing through openings in the mountain-range, fall into the Irish Channel, as well as the rivers which drain the eastern slope.

The Ovoca is formed by the junction of the Avon-More (22 or 23 miles long), and the Avon-Beg (15 miles long). From the junction of the Avon-More and the Avon-Beg the river, now called Ovoca, flows 9 miles into the sea below Arklow, receiving on its right bank the Daragh, or Derry (16 miles long), into which the Goldmine river (4 miles long) and the Ow (10 miles long) both fall.

The Liffey has a course of 19 or 20 miles, first W.N.W., then S.W. (partly within and partly upon the border of the county), to the place where it quits the county altogether to enter that of Dublin, to which it chiefly belongs.

The Slaney rises on the northern slope of Lugnaquillia, and flows in a winding channel 12 miles W., to a little below the junction of the Carrigower; it then turns S., and flows 6 miles by Baltinglass into the county of Carlow, to which county, and to the county of Wexford, the lower part of its course belongs. Its whole course in the county of Wicklow is about 18 miles.

The principal lakes are Lough Tay, Lough Dan, Lough Bray, and Glendalough.

Agriculture.—The soil of Wicklow is very fertile in the lower tracts and along the river-courses. The crops are oats, potatoes, and some wheat. Pasturage is also much attended to. The occupations of the people are generally agricultural. The average rent of land is 12*s.* an acre. In 1841 there were 9467 farms of more than one acre each, on which there were 12,538 horses, 45,293 cattle, 75,791 sheep, and 19,949 pigs.

Divisions and Towns.—Wicklow is divided into 8 baronies. It is partly in the diocese of Kildare and partly in the united diocese of Ossory, Ferns, and Leighlin. It is in the Leinster Circuit, and the assizes are held at Wicklow. The county sends 2 members to parliament. There are no parliamentary boroughs.

The following are the principal towns, with the population of each in 1841:—

Arklow, a market-town, 14 miles S. by W. from Wicklow, stands on the S. bank of the Ovoca, about 500 yards from its entrance into the sea. It consists of a main street, called the Upper Town, which runs parallel with the river, with a gentle descent towards the sea, near which is the part called the Fishery, consisting of mud cabins. A bridge of 19 arches crosses the Ovoca. There is a handsome modern church in the Upper Town, and also a Roman Catholic chapel. The shore is skirted by a line of low sand-hills, and the harbour can only be used by fishing-boats. Population, 3254.

Baltinglass, a market-town, 30 miles W. by S. from Wicklow, is a small and ill-built town. Population, 1928.

Bray, a market-town, 16 miles N. by W. from Wicklow, stands on both sides of a rivulet called the Bray, at its entrance in the Bay of Bray. The town, surmounting the steep banks of the rivulet, extends about a mile in length. It is a favourite bathing-place for the inhabitants of Dublin and other parts of Ireland, and is consequently provided with hotels, inns, lodging-houses, and other means of accommodation. There is a neat but plain church, and a handsome Roman Catholic chapel. Population, 3169.

Rathdrum, a market-town, 7½ miles W.S.W. from Wicklow, occupies the acclivities and summit of a hill. It is a poor-looking place. Population, 1232.

Wicklow, the county-town, 25 miles S.S.E. from Dublin, stands on the south side of the mouth of the æstuary of the Vartry, called the Broad Lough, which is formed by a low peninsula running parallel to the coast. The town consists of narrow streets irregularly laid out, and little better than a group of lanes. At the point of the peninsula, which is called the Murrough, is a suburb of the town, and the two are connected by a bridge of 8 arches. The town contains a church, a Roman Catholic chapel, a county gaol, a county court-house, an infirmary, the remains of an old castle, and the ruins of a Franciscan friary. Population of the town, 2794.

History and Antiquities.—This county appears to have been included in the dominions of the Cauci (Καῦχοι). The Slaney was perhaps the Modonus (Μόδονος) of Ptolemæus; and the Ovoca may be safely identified with the Oboca (Ὄβοκα) of the same writer. In the division of Leinster and Munster into shires by King John, what is now the county of Wicklow was included in that of Dublin, and was not formed into a separate county till 1605.

A remarkably fine group of churches, sometimes called the Seven Churches, remains in the secluded valley of Glendalough, about 13 miles W. from the town of Wicklow. Glendalough, at the time of the Anglo-Norman invasion (1169) was a bishopric, and there were a cathedral and other ecclesiastical buildings, which were then burnt and plundered. There are remains of several other churches and monasteries in the county, and of some old castles.

WICKWAR. [Gloucestershire.]

WIDGEON. [Ducks.]

WIELAND, CHRISTOPH MARTIN, was born Sept. 5, 1733, at Oberholzheim, a village in Suabia, where his father was pastor. The early years of his life were passed at Biberach, to which place his father had been transferred; and under the guidance of his parents his talents very early developed themselves. In his 14th year his father sent him to the school of Klosterbergen, near Magdeburg, where he paid great attention to the ancient as well as the modern languages. He next resided 18 months at Erfurt, and returned in 1750 to Biberach, where he fell in love with a cousin, Sophia von Gutermann, who afterwards became known as a writer under the name of Sophia de Laroche. Through her influence he became an enthusiast for religion; and it was from her that he conceived the idea of a didactic poem 'On the Nature of Things, or the most perfect World.' In the autumn of 1750 Wieland went to the university of Tübingen, professedly to study the law, but he occupied himself chiefly with classical literature, philosophy, and modern poetry. In 1751 he published his ten moral epistles ('Zehn Moralische Briefe'). In 1752 Wieland returned to Biberach, and soon after accepted an invitation from Bodmer to go to Zürich and remain in his house until he could find suitable employment. In the first year of his stay at Zürich Wieland prepared a new edition of a collection of essays against Gottsched on the improvement of taste in Germany. In 1754 Wieland left the house of Bodmer to undertake the education of the sons of two families at Zürich. Wieland about this time wrote the tragedies 'Lady Johanna Grey,' 'Clementina von Porretta,' and the comedy 'Pandora;' but they met with no success. He next accepted the situation of tutor in a family at Bern, but he soon gave it up, and occupied himself with lecturing on philosophical

subjects, and with new literary undertakings. At Bern, amongst other works, he wrote the beautiful story of 'Araspes and Panthea.'

In 1760 Wieland returned to Biberach, where he obtained an appointment in the administration of the town. He studied Shakspere, and translated into German 28 of his dramas (Zürich, 1762–66, 8 vols. 8vo.). This was the first though not the best German translation of Shakspere. During the same period he produced his poetical story of 'Undine' (1762), 'Komische Erzählungen' (1763–64), 'Abenteuer des Don Silvio von Rosalva' (1764), and 'Agathon' (1766), which is his best novel, besides other works.

In 1765 Wieland married the daughter of an Augsburg merchant, with whom he lived for 35 years. In 1769 he accepted the professorship of philosophy in the university of Erfurt. The secret and open attacks that were now made upon him, drew forth the humorous poem 'Der Verklagte Amor,' and 'Nachlass des Diogenes von Sinope' (1770). Wieland next attacked the doctrines of Rousseau in a small humorous novel entitled 'Koxkox und Kikequetzel' (1769 and 1770), and in his 'Beiträge zur geheimen Geschichte des menschlichen Verstandes und Herzens, aus den Archiven der Natur' (1770). Another work, which appeared two years later under the title 'Goldener Spiegel,' is a collection of the most important lessons which the rulers of mankind ought to derive from history.

In 1772 Wieland went to Weimar to educate the two sons of the Duchess, for which he received the title of Hofrath, and a salary of 1000 thalers. The first important work which appeared after Wieland's arrival at Weimar, was his humorous history of the inhabitants of the ancient town of Abdera ('Die Abderiten,' 1773), which the author intended to be an analysis of the errors, contradictions, and singularities in human nature. It was followed by 'Erzählungen und Mährchen' (1776–83). The greatest of all Wieland's poetical productions is his epic romance 'Oberon,' in 12 cantos, 1780.

After the publication of 'Oberon,' Wieland devoted the remainder of his life to the study of the Greeks and Romans. He had formed a plan of translating all the masterpieces of the ancients. He commenced with Horace's 'Epistles' and 'Satires,' which were followed by a translation of Lucian. Simultaneously with these labours Wieland wrote a great number of essays for the 'Deutscher Mercur.' A collection of all Wieland's works was published at Leipzig from 1794 to 1802, in 36 volumes, and six supplementary volumes, in 4to., and large and small octavo. The handsome remuneration which he received for this edition enabled him to purchase the small country-house of Osmannstedt, near Weimar, where he took up his residence in 1798, with his wife and children. His wife died in 1801. In 1803 he returned to Weimar, where he formed an intimate friendship with Schiller. In the same year he was elected a member of the National Institute of France. During the congress at Erfurt in 1808 Napoleon bestowed on him the order of the Légion d'Honneur. In 1806 he had commenced a translation of all the letters of Cicero, which he continued until his death, Jan. 20, 1813, without being able to complete it. It appeared at Zürich, 1808–1821, in 7 vols. 8vo.; the last 2 vols. were completed and edited by F. D. Gräter.

WIELICZA. [GALIZIA.]

WIESBADEN. [NASSAU.]

WIFE; HUSBAND and WIFE. The common law treats the wife (whom it calls a *feme covert*, and her condition *coverture*) as subject to the husband, and permits him to exercise over her reasonable restraint. A wife cannot sue separately from her husband for injuries done to her or her property, or be sued alone for debts, unless her husband shall have abjured or been banished the realm; or unless where she is separated from him and has represented herself as a single woman, or where, by particular customs, she is permitted to trade alone, as in London. For injuries to the wife's person or property the remedy is by a joint action. The husband and wife are considered for many purposes as one person; and from this fictitious unity are derived several of the rules of law: as for instance that they cannot make contracts with or sue one another. They cannot give evidence touching one another in civil matters, with one exception (6 Geo. IV., c. 16, s. 37). In criminal prosecutions for injuries done by either party to the person of the other, the injured party may be a witness. The husband takes the liability to the wife's debts contracted before marriage; but those debts are only recoverable during the wife's life. A wife is free from responsibility for offences short of murder and treason committed at his instigation. All deeds executed by her are void, unless by virtue of powers given to her or under the guarantee of certain solemnities. A will made before marriage, either by a man or a woman, is revoked by the subsequent marriage of the party who has made it.

No deed of separation (unless it contains an immediate and certain provision for the wife) and no public notice will relieve a husband from the liability to provide his wife with proper necessaries, or from paying the debts contracted for such necessaries, if she has been driven from his house by his misconduct.

A divorce can only be obtained by act of parliament. [ADULTERY; DIVORCE.] A separation from bed and board may be obtained by sentence of divorce pronounced by the ecclesiastical courts for conjugal infidelity or cruelty.

The sentence of separation relieves the husband of his responsibility for his wife's debts contracted after the sentence is pronounced, or, in case of his wife's adultery, contracted after the discovery of the adultery and the consequent separation. By the common law also, a husband is not liable for the debts of his wife contracted after she has quitted his house without sufficient cause, and he has given particular notice to the tradesmen that he will not pay her debts. Nor is he liable for debts contracted while she is living in open adultery. If the separation is obtained by the wife on account of the cruelty or adultery of her

husband, the spiritual court compels him to maintain her (if her separate property will not enable her to live according to her rank in life) by requiring him to make her an allowance proportionate to his means. [ALIMONY.]

Though a woman cannot take by direct grant from her husband, she can take by a grant made by her husband to trustees for her benefit. She can also acquire lands by descent and by purchase. [PURCHASE.]

By the common law the husband acquires all the personal property which the wife has at the time of the marriage, and also all that accrues to her during the marriage. He also acquires all her chattels real or leasehold interests; yet if a settlement has not been made on her expressly in consideration of her fortune, those portions of her personal property which consist of securities for money or beneficial contracts, and her chattels real, survive to herself, if the securities have not been realised and the chattels real have not been aliened during his life by her husband: a marriage settlement does not deprive her of this right with regard to things in action acquired subsequently to the execution of the settlement, unless it expressly reserves to the husband future as well as present personalty. If a husband requires the intervention of a court of equity for the purpose of reducing into possession his wife's property, the court will require him to make on her a settlement proportionate to the benefit which he derives.

The husband is entitled during his life to the profits of his wife's freehold estates of which she is seised at the time of marriage or during the coverture.

As to the wife's DOWER, see that article.

The Statute of Distribution (22 & 23 Car. II., c. 10) gives to the widow of an intestate husband (if her claim has not been barred by settlement) one-third of his personal property when there is issue of the marriage living, and one-half when there is none. The citizens of London and York are exceptions to the rule in the statute.

WIFE, ROMAN. [MARRIAGE, ROMAN.]

WIGAN. [LANCASHIRE.]

WIGHT, ISLE OF, on the south-coast of England, is separated from the mainland of Hampshire by a channel called the Solent Sea (*Pelagus Solvens* is the Latin name which Bede gives to it). The average breadth of this channel is less than 4 miles. It is narrowest to the west of Yarmouth, where it is contracted to about a mile by a narrow tongue of gravelly beach which runs out nearly 2 miles from the Hampshire coast, and on the extremity of which is situated Hurst Castle. At Spithead, which forms the entrance to the channel from the east, the width is from 2 to 3 miles. The current through the channel, both with the rising and ebbing tide, is extremely strong.

The form of the island is that of an irregular rhomboid or lozenge. The longer diameter from the Foreland on the E. to the Needles Cliff on the W., is not quite 23 miles; the shorter diameter, from West Cowes on the N. to St. Catharine's Point on the S. is about 13 miles; the circumference is about 56 miles, and the area is 86,810 acres, or nearly 136 square miles. It lies between 50° 35′ and 50° 46′ N. lat., and 1° 5′, and 1° 34′ W. long. The population in 1841 was 42,550.

The Roman name of the Isle of Wight was *Vectis*, which was probably pronounced Wectis, or Ouectis, the contracted form of which, Wect, is the most likely origin of the present name. In the Domesday-Book it is spelled Wect, Wict, and Wiht.

Coast and Surface.—The east and west coasts consist mostly of precipitous cliffs. On the west coast the cliffs of Alum Bay rise to the height of 300 feet. The unbroken face of a chalk ridge forms the south side of the bold promontory of which the three or four insulated masses of chalk called the Needles have formerly been a continuation. From this point, which forms Scratchell's Bay, a line of chalk precipices extends to Freshwater Gate, in many parts nearly perpendicular, the western part, called the Main Bench, being 600 feet high. The chalk cliff is continued eastward, the height gradually diminishing till it terminates at Compton. Thence a succession of narrow terraces, in some places quite perpendicular, gradually increase in height to the south front of St. Catherine's Hill, which rises to a height of upwards of 400 feet from an elevation of 400 feet above the sea. From St. Catherine's to St. Boniface, land-slips have formed a series of terraces, which have long been firmly settled, and thence to Dunnose there are similar land-slips, but more recent, ruinous, and unsettled. From Dunnose northward an almost unbroken line of perpendicular cliffs, at Luccombe 200 feet high, gradually decrease in height till they totally disappear at Sandown Bay; but in about half a mile the red cliffs of Yaverland begin to appear, and soon rise to the height of 200 feet. These are succeeded by the vertical face of the chalk range, which, as seen at Culver Cliff, is similar to the Needles promontory, but not so high.

The surface of the Isle of Wight is for the most part at a great elevation above the sea. A range of high chalk downs extends, with some interruptions and irregularities, from the Culver Cliff east to the Needles west. In this chalk range there are three principal depressions: between Yaverland and Brading, three-quarters of a mile wide, through which the eastern Yar flows; between St. George's Down and Carisbrooke, half a mile wide, through which the Medina flows; and at Freshwater, hardly 100 yards wide, through which the western Yar flows. The highest point of the chalk range is Mottiston Down, 698 feet above the sea. The south side of the island consists of a high range of downs, the upper part of which, on the west, is part of the chalk ridge; on the south, is chalk in horizontal strata; on the east is green sandstone and ironsand. A broad valley separates the lofty range of south downs from the central chalk ridge. The north side of the island, which is in general less elevated than the south side, consists of a great variety of wooded hills and valleys.

The most extensive of the valleys is that of the eastern Yar, alluded to above, which comprises a large portion of the most fertile land in the island.

The basin of the Medina, which is in general very narrow, forms a central valley. The S.W. valley is bounded E. by St. Catharine's Hill, and N. by the chalk ridge. Numerous small streams drain this tract, but as the coast is high, they enter the sea by narrow chasms called Chines. These chines all owe their formation to a common cause, the action of small streams which descend from the high land to the sea, and falling over the edges of the cliffs have worn for themselves deep gullies, some of which run inwards a considerable distance from the shore. The highest part of the island is St. Catharine's Hill, the summit of which is 830 feet above the sea.

Rivers.—The Medina rises near the N.E. foot of St. Catharine's Hill, and runs in a narrow valley till near Gatcombe, where the valley becomes wider; it then passes through the chalk ridge near the centre of the island, and flowing on the E. side of Newport, forms immediately below the town a wide æstuary, and enters the sea 5 miles to the N., between East and West Cowes. The eastern Yar, or Brading River, has its source in the same range of hills as the Medina. It passes through a narrow chasm in the chalk range between Brading and Yaverland, and forms Brading Haven, which at high water appears like a beautiful lake of 800 acres, but at low water is a surface of muddy sand crossed by the Yar. The western Yar rises near Freshwater Gate, and falls into the sea at Yarmouth; it is an æstuary in nearly its whole length, which is less than 3 miles. The Wootton River and the Newtown River are small streams which form similar æstuaries.

Geology.—The whole series of the strata which compose the Isle of Wight are exhibited in its precipitous cliffs in a very distinct manner. Some of the phenomena which those strata present are extremely curious. The N. side of the island consists of the strata above the chalk; the centre and the upper part of the S. side consists of the chalk; and the lower part of the S. and the S.E. sides consist of the strata below the chalk.

The most extraordinary circumstance in the geological structure of the Isle of Wight is the vertical or highly-inclined position of the central chalk ridge and of the plastic clay and London clay immediately N. of it. The strata farther to the N. and to the S. are horizontal, or nearly so, those to the S. being the chalk and underlying strata, which remain undisturbed, while those to the N. are more recent formations deposited horizontally and unconformably on the broken edges of the vertical strata. Two great sections of the vertical strata are exhibited by the Culver Cliff and the cliffs of Whitecliff Bay on the E., and by the Needles Cliff and the cliffs of Alum Bay on the W. In Whitecliff Bay, the plastic clay and sands form two low cliffs perfectly vertical. Rounding the cape to the S., the chalk of the Culver Cliff rises to a great height, at an angle of about 70°, dipping N.N.E., and gradually diminishing to about 50°. In Alum Bay, a section quite conformable, but more extensive and distinct, is exhibited. On the S. are the lower strata of chalk and chalk-marl at an angle of about 50° N.N.E., the upper strata of chalk at an angle of about 70°; farther to the N., the plastic clay and its sands, perfectly vertical; still farther to the N. the London clay, also vertical; and, farthest, a bed of yellow sand inclined at an angle of 60° or 70° N.N.E. The plastic clay in Alum Bay consists of clays, marls, and sands in countless layers, some extremely thin, of every variety of colour, and most of them, especially when recently cut, inconceivably bright, like the stripes of a ribbon or the streaks of a tulip. It contains also eight beds of wood-coal, or rather bituminised wood, each about one foot thick, and vertical, like the other layers. The line along which the disturbing force acted that occasioned the vertical position of the strata may be traced as far as Abbotsbury in Dorsetshire. The whole of the N. side of the island is considered to belong to these formations.

The S. side of the island, from Dunnose to St. Catharine's, consists, in the upper part, of chalk and chalk-marl, in nearly horizontal strata; the centre is green sandstone, beneath which is dark marl, and then ferruginous sand. Whenever the land-springs act on this marl, it is formed into mud, runs out, and leaves the green sandstone and chalk without support, which then tumble down. In this manner have been formed those picturesque terraces called the Undercliff.

Soil and Agriculture.—North of the chalk ridge the predominating soil is a stiff clay, which is extremely well suited for the growth of wood, especially oak, which, in the neighbourhood of East Cowes and St. Helen's, grows down to the water's edge. All the northern half of the island is much inferior to the southern half as arable land. The soil of the whole of the south part of the island is generally a rich red loam, in some parts inclining to sand, in others more stiff and clayey, but everywhere extremely fertile. Timber does not grow well on the south side of the island. Almost all the lower tracts are employed in tillage, and the produce of wheat especially is greater than in almost any other part of the kingdom. Wheat, barley, and oats are exported to a considerable amount annually, and all kinds of pulse and green crops are cultivated. The pastures and meadows are rich, but few oxen are reared. Dairies are attached to most of the larger farms. Large flocks of sheep are fed on the downs.

The climate is very mild, especially in the valleys and sheltered parts of the south side of the island. Laurels, myrtles, geraniums, and various kinds of delicate evergreens, flourish through the winter.

The Isle of Wight is much visited, as well for the extraordinary geological structure of its cliffs as for the beautiful scenery of the interior.

Divisions, Towns, &c.—The Isle of Wight is included in the county of Southampton (Hampshire). The two nearly equal divisions of the island formed by the Medina constitute the Liberties of East Medina and West Medina. By the Reform Act of 1832, the Isle of Wight was separated from Hampshire for parliamentary purposes, and returns one member to the House of Commons, besides which two members are returned for the borough of Newport.

The following are the towns, with the population of each in 1841 :—

Brading is a small town situated on the slopes of two opposite hills on the S.E. side of the island. Several of the houses are ancient, consisting of bricks supported by timber framework. The market-house and town-hall is a small structure. The church is large, and of considerable antiquity. Brading Haven admits small vessels when the tide is in. Sir Hugh Middleton attempted to reclaim the haven from the sea by making a dyke, for which purpose he brought over workmen from Holland, but the sea broke in, and the attempt was never afterwards resumed. Population of the parish, 2701.

Cowes, West and *East*, are situated respectively on the west and east sides of the mouth of the Medina. *East Cowes* is a small place, but it contains the custom-house for the whole island. The communication with West Cowes is by a ferry. About a mile E. from East Cowes is Osborne House, the residence of the Queen.

West Cowes is built at the bottom and on the side of a steep hill. The lower streets are narrow and irregular, but the upper part of the town is picturesquely situated, and there are many elegant cottages and gentlemen's seats near it. There is a town-hall and market-house, a very plain building. The church was built in 1653, and enlarged in 1811. Another church was consecrated in 1832. There are three or four places of worship for dissenters. Population of the town, 4107.

Newport, the capital town of the Isle of Wight, a municipal borough, and parliamentary borough, is situated in a valley near the centre of the island, on the west bank of the Medina, which is navigable to Newport. The tide flows nearly to Newport Bridge, and carries large barges to the quay, which is built in front of the town, where the Carisbrooke stream falls into the Medina. Vessels of considerable burthen can ascend with high tides. The town is built on an easy ascent, and the streets, which are sufficiently wide, cross each other at right angles. It is a very pretty town, well paved, lighted with gas, and clean. The town-hall and market-house form a neat structure. There is also a gaol. The Isle of Wight Institution, which is a public library and reading-room, is an elegant building. There is also a Mechanics' Institute. The free grammar-school is a large stone building, erected in 1619. The conferences between Charles I. and the parliament were held in the school-room, and lasted some weeks. There are two assembly-rooms, and a small but neat theatre. The church is a large plain structure. There are six chapels belonging to different classes of dissenters. Parkhurst Prison, for juvenile convicts, is in the neighbourhood of Newport. The municipal borough is divided into 2 wards, and is governed by 6 aldermen, of whom one is mayor, and 18 councillors. The parliamentary return gives the population of the town and borough as 3858 ; but as a considerable part of the actual town is in the parish of Carisbrooke, this is not the true population of the town proper. It is probably about 5000. The parliamentary borough returns two members. Population, 6330.

Newtown, on the N. coast, half way between Yarmouth and West Cowes, formerly sent 2 members, but was disfranchised by the Reform Act.

Ryde, a market-town, 7 miles E.N.E. from Newport, is situated on the N. shore of the island. The town is modern. The streets are wide, and tolerably regular, well paved, and cleansed. The houses being generally stuccoed, and of various forms and sizes, and intermingled with the foliage of trees in the numerous gardens, the appearance of the town is very picturesque. The market-house and town-hall form a handsome building. St. Thomas's chapel and St. James's chapel are both dependent on the parish church of Newchurch, which is 7 miles distant. There are two or three places of worship for dissenters. There are baths near the pier. The town has considerable trade: it exports corn, flour, sheep, calves, lambs, &c., and East and West India ships frequently call here to supply themselves with provisions for their voyages. Boat and yacht building are carried on, and occasionally larger vessels are built. The pier which was completed in 1814, is mostly of wood, and extends 1740 feet into the sea. It is furnished with an iron railing and covered seats, and forms a very fine parade. Population of the town, 5840.

Ventnor, a large village and bathing-place 9 miles S.S.E. from Newport, is situated near a portion of the Undercliff, and has extended within a few years from a few houses to a place of considerable size, containing a church, hotels, boarding-houses, and handsome shops. The population, which in 1841 was 970, is now much larger.

Yarmouth, a small market-town, is situated at the mouth of the æstuary of the western Yar. It has an excellent roadstead, and there is communication by steam-boat twice a day with Lymington. It has a town-hall and market-house, a church, a Methodist chapel, and a Baptist chapel. Yarmouth formerly sent 2 members to parliament, but was disfranchised by the Reform Act. Population of the town and parish, 567.

History and Antiquities.—The Isle of Wight was conquered by Claudius, A.D. 43. In 495 it was conquered by Cerdic the Saxon, who destroyed the original inhabitants, and replaced them by his own countrymen. William the Conqueror bestowed it on his kinsman William Fitz Osborne, and created him Lord of the Isle of Wight. A succession of Norman Lords held it till 1445, when Henry VI. created Beauchamp, Earl of Warwick, King of Wight, and crowned him with his own hands. The kingly title however was not continued, and the last of the Lords was the Earl Rivers, who was beheaded by Richard III. in 1483. On the accession of Henry VII. Sir Edward Widville, or Woodville, brother to the late Earl Rivers, was made Captain of the Isle of Wight, and the title was held by his succesors for a considerable period. The last captain was the Earl of Portland, who was displaced by the parliament, and the Earl of Pembroke was appointed Governor in his place. He was succeeded by Colonel Hammond, and during his governorship Charles I. fled to the Isle of Wight

after his escape from Hampton Court. He arrived there Nov. 1, 1647. He made several unsuccessful attempts to escape. A conference between Charles and the parliament was held in the school-room of the free-school of Newport, which lasted some weeks. On the 29th of Nov. 1649, he was seized, and conveyed to Hurst Castle. The title and office of Governor of the Isle of Wight is still continued.

The Isle of Wight does not abound in antiquities. Barrows are found on the downs, but there are no traces of Roman forts or camps, or of Saxon warfare. Carisbrooke Castle is the only ancient fortress. Its keep is perhaps anterior to Norman times, but no other part of it. During the rule of the Lords of Wight, whose power and privileges were almost regal, the present village of Carisbrooke was the capital of the island, and Carisbrooke Castle was the residence of the Lords. The castle stands on a lofty eminence, and the keep still higher on an artificial mound. Fitz Osborne the Norman built the castle, and included the keep within the ditch with which he surrounded the whole. The castle was successively enlarged by subsequent lords. There were several conventual establishments in the island, but none of large size except Quarr Abbey, of which there are a few remains. Carisbrooke Priory is entirely demolished, except the church, which is now parochial. There is a small but very curious turret on the summit of St. Catharine's Hill. Some of the parochial churches are perhaps as old as the Norman conquest; some possibly older. Yaverland church is one of the most ancient. The entrance-door is arched, and has what appear to be Saxon mouldings of very uncommon forms.

WIGTON. [Cumberland.]

WIGTON. [Wigtonshire.]

WIGTONSHIRE, or *Wigtownshire*, the most southern county of Scotland, is bounded E. by Wigton Bay, N.E. by Kirkcudbright, N. by Ayrshire, W. by the Irish Channel, and S. by the Irish Sea. It lies between 54° 38′ and 55° 4′ N. lat., and between 4° 16′ and 5° 6′ W. long. The area is 459 square miles. The population in 1841 was 39,195.

Wigtonshire is indented by spacious bays and harbours. Wigton Bay runs inland 10 miles, and diminishes from a width of 8 miles until it terminates in the river Cree. Luce Bay forms an indentation in the S. part of the county, and stretches inwards about 15 miles; the distance between the two headlands of Barrow Head and the Mull of Galloway is about 15 miles, the Mull being the most southern point of Scotland. Loch Ryan Bay, on the N.W. extends inland about 8 miles to Stranraer, its breadth varying from 2 to 4 miles.

The surface of Wigtonshire, though consisting of eminences and hills of considerable height, is said to be less elevated above the level of the sea than any other county in Scotland. The principal eminences vary from 400 to 900 feet in height. From the general mildness of the winter the county has been termed the Devonshire of Scotland. It may be divided into three districts:—the Rhynns (peninsula), which lies west of a line drawn between Luce Bay and Loch Ryan: the Machers (flat country), lying between Wigton Bay and Luce Bay; and the Moors, which include the remainder, being more than one-third of the whole county. The fresh-water lochs are numerous, but small. The only navigable rivers are the Cree, navigable for about 4 miles, and the Bladenoch, for a still shorter distance: both empty themselves into Wigton Bay. The Luce, which falls into Luce Bay after a course of 21 miles from the borders of Ayrshire, is easily crossed on foot, except when floods occur. The other streams of the county are comparatively insignificant. The soil of the Machers and the Rhynns is for the most part a hazelly loam, dry, and adapted for the turnip husbandry. There is a tract of rich alluvial land in the eastern part of the county. The Moors are bleak and barren, and in many places consist of peat land partially covered with water. Out of 288,960 English acres which the area of the county comprises, 101,136 acres, or about 35 per cent., are under cultivation, and 187,824, or about 65 per cent., in pasture. A great impulse has been given to agriculture since the introduction of steam-navigation which has given the farmers access to some of the best markets in England and Scotland, both for corn and cattle. There are steam-boats to Glasgow, Belfast, Liverpool, and Whitehaven. The handsome and active little breed of horses known as Galloways is fast becoming extinct.

Wigtonshire is divided into 17 parishes. One member is returned to parliament for the county, and one for the parliamentary District of Wigton, Whithorn, Stranraer, and New Galloway.

The following are the towns and principal villages, with the population of each in 1841:—

Garlieston, a village on the S.W. side of Garlieston Bay, an indentation in Wigton Bay, has a small harbour, which admits vessels of 100 tons burthen. Population of the village, 656.

Newton-Stewart, a burgh of barony and market-town, 8 miles N. by W. from Wigton, stands on both sides of the Cree, which is crossed by an elegant bridge of granite. Vessels of 45 tons come up to Carty, 1½ mile below Newton-Stewart. Population of the burgh of Newton-Stewart, 2172.

Portpatrick, about 30 miles W. by S. from Wigton, on the west coast, owes its importance to its having been made in 1662 a regular post-packet-station between Scotland and Ireland. It is 22 miles distant from Donaghadee in Ireland. Piers and quays have been built, and a good harbour formed artificially in place of a mere inlet between two ledges of rock which advanced into the sea. Population, 996.

Stranraer, the principal sea-port of Wigtonshire, stands at the head of the bay called Loch Ryan, about 25 miles W. by N. from Wigton. The town contains a town-house, church, and two or three places of worship for dissenters. There is a pier to which tolerably large vessels can come up at full tide, but the beach is dry at low water. The trade is with Glasgow, Liverpool, and other large towns. Population, 3440.

Whithorn, a small town about 12 miles S.

from Wigton, consists chiefly of a single street. Population, 1502.

Wigton, or *Wigtown*, the county town of Wigtonshire, a sea-port, and chief town of a parliamentary District, stands on the W. side of Wigton Bay, in 54° 51′ N. lat., 4° 24′ W. long. The town stands on an eminence about 200 feet above the level of the sea. The harbour is about a quarter of a mile S. from the town, in the æstuary of the Bladenoch Water, and admits vessels of about 100 tons burthen. Population of the town of Wigton, 1972. The parliamentary District includes Wigton, Whithorn, and Stranraer, in Wigtonshire, and New Galloway, in Kirkcudbrightshire. Population, 8681.

Wigtonshire formed a part of the ancient province of Galloway, and is sometimes called West Galloway. [GALLOWAY.]

WILBERFORCE, WILLIAM, was born at Hull, August 24, 1759. His father, Robert Wilberforce, was a merchant in that town. He commenced his education at the grammar-school of Hull; but on the death of his father in 1768, he was transferred first to the care of his uncle, and soon afterwards to Pocklington grammar-school in Yorkshire. In Oct. 1776, he entered St. John's College, Cambridge.

By the death of his grandfather and his uncle he had become possessed of a handsome fortune, and he had scarcely completed his 21st year when he was elected M.P. for Hull. He now came to London, and attended constantly in the House of Commons. When, in 1783, his friend Pitt became prime minister, Wilberforce exerted himself in support of the new administration. His popularity was now great, and in 1784 he was returned without opposition for Yorkshire, just after he had been re-elected for Hull. The seductions of society and ambition had never wholly effaced from his mind the religious impressions of his youth, and a tour on the Continent with Isaac Milner, in 1784-5, revived his latent zeal. Henceforth a spirit of earnest piety and devotion took entire possession of his mind.

He hastened from abroad to support Pitt's measure of parliamentary reform, and early in 1786 he himself proposed an important plan for purifying county elections, which however was not carried into effect. Early in 1787 his religious zeal was displayed in promoting the establishment of a society for the reformation of manners, and he obtained a royal proclamation against vice and immorality. While under the influence of these feelings, the slave-trade, which had roused his indignation at school, was again presented to him in all its atrocities, and he resolved to devote himself to its abolition. Throughout the struggle, which lasted for 20 years, Mr. Wilberforce was indefatigable. At length, in 1807, the abolition bill was passed. During the whole of this period, in the course of which he had continued to represent Yorkshire, he had interested himself in all the momentous questions. In the midst of his various engagements he had also done service to religion. In 1797 he published his 'Practical View of the prevailing Religious System of professed Christians in the Higher and Middle Classes of this Country, contrasted with real Christianity.' This work met with extraordinary success.

In 1797 he had married Barbara Ann, eldest daughter of J. Spooner, Esq., by whom he had a family of six children, whose education he was now anxious to watch over. He accordingly resigned his seat for Yorkshire, and undertook the less onerous duty of representing the borough of Bramber. In 1825 he retired from parliament. He died in London, July 29, 1833, and was buried in Westminster Abbey.

WILBYE, JOHN. Of this admirable composer all that is known, his works excepted, is, that in 1598 he was a teacher of music, and dwelt in Austin Friars, London. In that year he published a set of 'Madrigals, to three, four, five, and six Voices,' and a second book of the same in 1609. Many of his madrigals have great merit, and are still popular.

WILKES, JOHN, was born in Clerkenwell, London, Oct. 17, 1727. His father, a distiller, gave him a liberal education, principally at the university of Leyden. In 1757 he was elected a member of the House of Commons for Aylesbury, for which place he was re-elected in 1761. In 1762 he commenced the publication of his newspaper, the 'North Briton,' which he undertook in opposition to 'The Briton,' a paper written in defence of Lord Bute's administration. In No. 45 of his paper he charged the king with having uttered a falsehood in his speech from the throne; upon which proceedings were taken against the author, and the House of Commons in the following session (1763) voted the paper a 'false, scandalous, and seditious libel,' and ordered it to be burned by the common hangman. When the sheriffs of London proceeded to execute this sentence at the Royal Exchange, they were insulted by the mob, and a riot ensued. He had been committed to the Tower, on a general warrant, but was liberated on account of his parliamentary privilege, upon which he brought an action against the under-secretary of state for the seizure of his papers; and on the cause being tried, he obtained a verdict in his favour, with 1000*l.* damages. This did not however prevent him from being expelled from the House of Commons, Jan. 19, 1764; convicted in the Court of Queen's Bench, Feb. 21, of republishing No. 45 of the 'North Briton,' and of printing and publishing an 'Essay on Woman,' an obscene poem, of which he had printed only 12 copies, one of which was surreptitiously obtained by the government. Wilkes had in the meantime withdrawn to France, and not appearing to receive the judgment of the court, he was outlawed. In 1768 he returned to England, and was returned to the House of Commons for Middlesex. After his election he surrendered himself before the Court of King's Bench, but the court refused to commit him upon his outlawry, as moved by the attorney-general, and he was discharged. He was arrested immediately afterwards on a writ of *capias utlagatum*. Mr. Wilkes's outlawry was afterwards reversed by Lord Mansfield, but judgment was pronounced upon him for his two libels, and he was sentenced to two fines of 500*l.* each, and to imprison-

ment for the two terms of ten and twelve months. He was soon afterwards again expelled from the House of Commons for publishing an assertion that the secretary of state had 'planned and determined upon the horrid massacre in St. George's Fields three weeks before it occurred.'

A new writ was issued for Middlesex, and Mr. Wilkes was re-elected without opposition and without expense. The House resolved that this election was void, and issued another writ. Mr. Wilkes was again chosen without a contest, when the House declared him incapable of being elected into that parliament. Notwithstanding this, he stood once more, and was returned a third time without opposition. This election having also been declared void, the government persuaded Colonel Luttrell to vacate his seat in parliament, and to oppose Mr. Wilkes in the approaching election. Mr. Wilkes was returned by an overwhelming majority, yet the House of Commons declared that Col. Luttrell, being next on the poll, was duly elected. This decision excited a feeling of indignation throughout the whole kingdom. Meanwhile subscriptions were opened for the payment of his fines and personal debts, and upwards of 20,000*l.* were raised. On the reversal of his outlawry, Mr. Wilkes had proceeded with an action against Lord Halifax for false imprisonment and the seizure of his papers. In Nov. 1769, the cause was tried in the Common Pleas, when he obtained a verdict, with 4000*l.* damages.

In the following April, Mr. Wilkes was discharged from his confinement on giving a bond for his good behaviour during seven years. He was shortly afterwards elected an alderman of London, for the ward of Farringdon Without. He served as sheriff in 1771; and in 1774 was chosen Lord Mayor. In the same year, on the dissolution of parliament, he was again elected for Middlesex; he then took his seat, and continued in the House of Commons for many years. His popularity had declined, but the lucrative office of chamberlain of the City of London, which he obtained in 1779, was a compensation for the loss. On May 3, 1782, the House voted that the resolution of the 17th Feb., 1769, by which he had been declared incapable of re-election, and all the other orders and resolutions concerning the Middlesex election, should be expunged from their journals. In 1784 he was again elected for Middlesex. He did not offer himself again at the dissolution in 1790, but retired into private life. He died Dec. 27, 1797.

WILKIE, WILLIAM, D.D., was born at Echlin, Linlithgowshire, Scotland, Oct. 5, 1721. He studied at the University of Edinburgh, which he left to take charge of a farm which had been held by his father near that city. In the meantime he continued his studies, and took orders in the Church of Scotland. In 1757 he published 'The Epigoniad, a Poem, in nine books.' It was an epic poem, but it found little favour. In 1759 Wilkie was chosen Professor of Natural Philosophy at St. Andrews. In 1768 he published a volume of 'Moral Fables,' in verse, which suffered the fate of his epic. He died Oct. 10, 1772.

WILKIE, SIR DAVID, was born at the manse of the parish of Cults, in Fifeshire, of which his father was minister, Nov. 18, 1785. He receive some education at the school of Pitlessie, and a the grammar school of Kettle; but he paid littl attention to anything except drawing. The ben of his mind being uncontrollable, he was sent, i 1799, to the Trustees' Academy of Edinburgh fo the Encouragement of Manufactures. In 1803 h won the ten-guinea premium that was awarded i that year, for the best painting of Callisto in th bath of Diana. In 1804 he left the academy, an returned home, where he painted many portrait in small and in miniature, and the Village Recruit which he took with him to London, and sold fo 6*l.* Wilkie lost no time in obtaining admission a a student at the Royal Academy. His first patro in London was Stodart, the piano-forte-make who sat for his portrait, ordered him to paint tw pictures, and introduced him to a valuable con nection. The Earl of Mansfield now commissione him to paint a picture from his sketch of the Villag Politicians; but though the picture met wit general admiration, the Earl demurred at givin 30 guineas for it. Wilkie now settled in Londo where commissions crowded in upon him. Hi next works were—the Blind Fiddler, Alfred i the Neatherd's Cottage, the Card-Players, and th Rent-Day; painted in 1807 and 1808. He the painted the Sick Lady, the Jew's-Harp, and th Cut Finger. The Ale-House Door, afterward called the Village Festival, was painted for M Angerstein for 800 guineas, and is now in th National Gallery. In 1809 he was elected a Associate of the Royal Academy, and a Membe in 1811.

In 1814 he went with his friend Haydon t Paris, where he was especially struck with the pi tures of Ostade and Terburg. In 1814 and 181 he painted Distraining for Rent, the Pedlar, an the Rabbit on the Wall. In the summer of 181 he went with Raimbach, the engraver, to Hollan and Belgium. After a visit to Scotland, he com menced in 1819 his picture of the Reading the Will, for the late King of Bavaria, whic he finished in the following year. In 1821 h finished his Chelsea Pensioners. This pictur painted for the Duke of Wellington for 120 guineas, is certainly Wilkie's master-piece. I 1825 he set out with one or two friends on continental tour, and during an absence of thr years he visited the principal places in Franc Spain, Germany, and Italy. After the death Sir Thomas Lawrence, in 1830, Wilkie was a pointed painter in ordinary to his Majesty. H afterwards produced many excellent works, amon which were a few of the historical class, whic can hardly be said to have added to his reput tation. In 1836 he was knighted by William I In the autumn of 1840 Sir David set out wi his friend Mr. Woodburn upon his tour to the Eas He went by Holland and the Rhine to the sou of Germany, and thence to Constantinople by th Danube. At Constantinople he painted a po trait of the young Sultan. Wilkie and his frie went to Smyrna, Rhodes, Beyrout, Jaffa, an arrived at Jerusalem, Feb. 27, 1841. Towar the end of the ensuing April they were at Ale andria, where Wilkie commenced a portrait

Mehemet Ali. He embarked for England, May 21, was taken ill on the voyage, and died June 1, 1840, off Gibraltar. In the evening of the same day his body was committed to the deep.

WILKINS, JOHN, was born near Daventry in Northamptonshire, in 1614. In 1627 he was admitted a student at New Inn Hall, Oxford, whence he removed to Magdalen Hall, and took the degree of B.A., Oct. 20, 1631, and that of M.A., June 11, 1634. At the age of 21 he took orders, and became successively chaplain to Lords Say and Berkeley, and Charles, Count-Palatine of the Rhine. On the breaking out of the civil war he took the side of the parliament. In the meantime he promoted those meetings in London which eventually led to the formation of the Royal Society. In 1648 he was appointed Warden of Wadham College, Oxford, where he took the degrees of B.D. and D.D. About 1656 he married Robina, widow of Peter French, and sister of Oliver Cromwell. In 1659 he was appointed Master of Trinity College, Cambridge, but was ejected at the Restoration. On the formation of the Royal Society in 1763 he became one of the council. He was soon promoted to the deanery of Ripon, and in 1668 to the bishopric of Chester. He died Nov. 19, 1672. Among the principal of Bishop Wilkins's works are the following—'Discovery of a New World; or a discourse tending to prove that it is probable that there may be another habitable world in the moon,' 1638; 'Discourse concerning a new Planet, tending to prove that it is probable our Earth is one of the Planets,' 1640; 'Mathematical Magic, or the Wonders that may be performed by Mechanical Geometry,' 1648; 'An Essay towards a Real Character and a Philosophical Language,' 1668. Wilkins also published several theological works.

WILKINS, SIR CHARLES, born in 1749, at Frome, in Somersetshire. He obtained a writership on the Bengal establishment, and arrived at Calcutta in 1770. In a few years he had made considerable progress in Arabic, Persian, and some of the spoken languages of India. He also made himself master of the Sanscrit. He returned to England in 1786, in consequence of ill health. In 1787 he published an English translation of the 'Hitopadésa of Vishnu Sarma,' being the Sanscrit original of that Persian collection of fables, the French and English versions of which are known by the name of the 'Fables of Pilpay.' Not long afterwards he began to arrange the materials for a Sanscrit grammar; but in consequence of the burning of his house at Hawkhurst, in Kent, and other circumstances, the grammar was not published till 1808. In 1801 he was appointed librarian to the East India Company, and in 1805 he became visitor and examiner of the students in the Oriental department both at Haileybury and at Addiscombe. He died May 13, 1806.

Among the published works of Sir Charles Wilkins, beside those already mentioned, are, a new edition of Richardson's 'Arabic and Persian Dictionary' (1806-10), and the Roots of the Sanscrit Language (1815). In 1833 George IV. conferred on him the honour of knight bachelor and knight commander of the Guelphic order.

WILKINS, WILLIAM, was born Aug. 31, 1778, at Cambridge, where his father was a builder. He matriculated at Gonville and Caius College in 1796, and graduated as sixth wrangler in 1800. Having in the following year obtained a travelling bachelorship, he visited Italy and Greece; and almost immediately after his return, he published his 'Antiquities of Magna Græcia,' 1807. In the same year he was employed as architect of Downing College, Cambridge; he was also the architect of University College, Gower Street, London; University Club-House, Pall-Mall East; and the National Gallery. On the death of Sir John Soane, in 1837, Wilkins was elected to succeed him as professor of architecture at the Royal Academy, of which he had been made a member in 1834. He did not deliver any lectures at the Academy. He died at Cambridge, Aug. 31, 1839.

Wilkins published 'Atheniensia, or Remarks on the Buildings and Antiquities of Athens,' in 1816; and a part of 'The Civil Architecture of Vitruvius,' in 1812.

WILL AND TESTAMENT. Before the passing of the 32 Hen. VIII., c. 7, commonly called the Statute of Wills, and the 34 & 35 of Henry VIII., c. 5, there was no general testamentary power over freehold land in England. Even the power of disposing of his personalty did not originally extend to the whole of a man's personal estate. At present by the 1 Vict., c. 26, for the amendment of the law with respect to wills (whereby the former statutes there enumerated with respect to wills are repealed, except so far as the same acts or any of them respectively relate to any wills of estates *pur autre vie* to which this act does not extend), it is enacted that it shall be lawful for every person to devise, bequeath, and dispose of, by his will, executed as required by that act, all real and personal estate which he shall be entitled to either at law or in equity at the time of his death. Great alterations have been introduced into the law of wills by this statute; but it does not extend to any will made before the 1st of January, 1838.

In general all persons are capable of disposing by will of both real and personal estate who have sufficient understanding. By the second section of the new Wills Act, no will made by any person under the age of twenty-one years is valid; and no will made by any married woman is valid, except such a will as might have been made by a married woman before the passing of the new act. The validity of a lunatic's will depends upon the state of his mind at the time of making it. Persons born deaf and dumb are presumed to be incapable of making a will, but the presumption may be rebutted by evidence. Blindness and deafness alone do not produce incapacity.

By section 3 of 1 Vict., c. 26, the power of disposition by will extends to all real and personal estate, and to all estates, interests, and rights to which the testator may be entitled at the time of his death, though acquired subsequently to the execution of his will. There is no restriction as to the persons to whom devises or bequests may be made except under the 34 & 35 Hen. VIII.

c. 5, which forbids devises of lands to bodies politic and corporate. Exceptions to this statute have been introduced by the 43 Geo. III., c. 107, and 43 Geo. III., c. 108, which authorise devises of lands to the governors of Queen Anne's Bounty, and for the erection or repair of churches or chapels, the enlargement of churchyards or of the residence or glebe for ministers of the Church of England. By the 9 Geo. II., c. 36, no lands or personal estate to be laid out in the purchase of or charged on land can be given to any charitable use by way of devise. [MORTMAIN.] By the 40 Geo. III., c. 98, no disposition of property can be made by will or otherwise, so as to accumulate the income for a longer period than for twenty-one years after the death of the settler, or during certain minorities [ACCUMULATION]; and by what is called the rule against perpetuities, no property can be settled by deed or will so as to be inalienable for more than a life or lives in being, and twenty-one years afterwards.

Before the 1 Vict., c. 26, wills of personal estate might even be nuncupative, that is to say, might be declared by the testator without writing before witnesses, provided they were made in conformity with the directions contained in the 19th section of the Statute of Frauds (29 Car. II., c. 3). By the 14th section of 1 Vict., c. 26, no will is to be void on account of the incompetency of any attesting witness. By the 15th section gifts to attesting witnesses or their wives or husbands are declared void. By the 9th section of 1 Vict., c. 26, no will, whether of real or personal estate, is to be valid unless it be in writing, and signed at the foot or end by the testator or by some person in his presence and by his direction; and such signature must be made or acknowledged by the testator in the presence of two or more witnesses present at the same time, and such witnesses must attest and subscribe the will in the presence of the testator, but no particular form of attestation is necessary. Section 10 enacts that all appointments made by will are to be executed in the manner above prescribed, and are to be valid when so executed notwithstanding the non-observance of any other ceremonies required by the power under which the appointment is made. By the 11th and 12th sections, it is declared that the act is not to affect the wills of soldiers on actual service or of mariners at sea, which are to remain subject to the particular provisions made respecting them by the 11 Geo. IV. and 1 Wm. IV., c. 20.

It is the rule in England, that a will of lands is regulated by the law of the country in which the lands are. The place where and the language in which such a will is written are unimportant: the locality of the lands is the only point to be considered. A will made in France and written in French, of lands in England, must contain expressions which, when translated into English, would properly designate the lands in question, and must be executed according to the forms required by the English law. Lands in England which belong to an English subject domiciled abroad and dying intestate, will descend according to the English law. With respect to personalty, in cases both of testacy and intestacy, the law is different. If a British subject becomes domiciled abroad, the law of his domicile at the time of his death is the rule which the English courts follow in determining the validity of his will and administering his personal property in England, and vice versâ in the case of a foreigner dying domiciled in England. Cases sometimes arise in which it is difficult to determine what was the domicile at the time of the death of the party, and consequently what rule is to be followed in the distribution of his personal estate. If an Englishman domiciled abroad has real property in England, he ought, on account of the difference of the doctrine with respect to real and personal property, to make two wills, one duly executed according to the English law for devising his real estate, and another framed according to the law of his domicile for the disposal of his personal property.

A will is revocable. By section 18 of the new act every will made by a man or woman is revoked by marriage, except a will made in exercise of a power of appointment when the real or personal estate thereby appointed would not, in default of appointment, pass to the heir, personal representative, or next of kin of the appointor. By the 20th section no will or codicil is revocable except as above mentioned, or by another will or codicil executed in the manner required by the act, or by a writing declaring an intention to revoke, executed in the same manner, or by burning, tearing, or otherwise destroying the will by the testator himself, or by some other person in his presence, and by his direction, with intent to revoke. By the 21st section no obliteration, interlineation, or other alteration made in any will after execution is to have any effect, except in so far as the words or effect of the will previous to the alteration cannot be made out, unless the alteration be executed as a will, such execution to be in the margin opposite or near to the alteration, or to a memorandum referring to the alteration. The 21st section alters the law as to the effect of obliterations where the words remain legible, and of cancellation by drawing lines across the whole or any part of the will. These acts will now be of no effect unless properly executed and attested. By the 23rd section no conveyance or other act made or done subsequently to the execution of a will of real or personal estate, except an act of revocation, is to prevent the operation of the will upon such estate or interest as the testator has power to dispose of at the time of his death; and by the 24th section every will is to be construed with reference to the real and personal estate comprised in it, so as to take effect as if it had been executed immediately before the death of the testator, unless a contrary intention appear on the will.

The 22nd section of the act provides that no will or codicil, or any part thereof, which shall have been in any manner revoked, shall be revived otherwise than by the re-execution thereof, or by a codicil executed in manner required by the act, and showing an intention to revive the same; and when any will or codicil which shall

be partly and afterwards wholly revoked, shall be revived, the revival is not to extend to such parts as had been revoked before the revocation of the whole, unless a contrary intention appear.

Estates or interests in property created by way of executory devise or bequest, that is to say, such as are made expectant on the determination of prior estates in the same property, may be, like estates created by way of remainder in a deed, either vested or contingent. So far as depends upon the nature of the limitations themselves, the same rules are in general applicable to executory devises or bequests as to remainders. It may be observed generally that when a future gift is preceded by a gift of the immediate interest, it is to be presumed that the enjoyment only is postponed, and that the future gift is vested in the interest; whereas when there is no gift of the immediate interest, the contrary presumption obtains; and again, that when the enjoyment of a gift is postponed, not on account of circumstances personal to the object of the gift, but with a view to the circumstances of the estate, the gift is to be presumed vested. With respect to pecuniary legacies, some distinctions are admitted which have no place as to real estate. One of these distinctions is that where futurity is annexed to the substance of the gift, the vesting is in the meantime suspended; but where the time of payment only is future, the legacy vests immediately. If however the only gift is contained in the direction to pay, this case is to be regarded as one in which time is annexed to the substance of the gift. When a future gift of a principal sum is coupled with a gift of the interest in the meantime, a strong presumption exists in favour of vesting. It is generally considered that a very clear expression of intention must exist in order to postpone the vesting of residuary bequests, on the ground that intestacy may often be the consequence of holding them to be contingent.

Great changes have been introduced in the law, as to the interpretation of wills by the abovementioned 24th section of the act, which declares that wills are to be construed to speak as if they were executed immediately before the death of the testator, and the six following clauses. The 25th section enacts that, unless a contrary intention appear on the will, a residuary devise shall include all estates comprised in lapsed and void devises. The 26th clause enacts that a general devise of the testator's lands shall include copyhold and leasehold as well as freehold lands, unless a contrary intention appear. By the 27th section, unless a contrary intention appear, a general devise of real estate and a general bequest of personal estate are respectively to include estates and property over which the testator has a general power of appointment. By the 28th section a devise of real estate without words of limitation is, unless a contrary intention appear by the will, to be construed to pass the fee. This clause introduces a very considerable alteration of the old law, under which, in accordance with the doctrine that the heir was not to be disinherited by implication, it was settled that a devise of lands without words of limitation conferred on the devisee an estate for life only, notwithstanding the appearance of a contrary intention in other parts of the will. The 29th section enacts, that in any devise or bequest of real or personal estate the words 'die without issue,' 'die without leaving issue,' or 'have no issue,' or any other words of the like import, shall be construed to mean a want or failure of issue at the time of the death, and not an indefinite failure of issue, unless a contrary intention appear; except in cases where such words mean, if no issue described in a preceding gift shall be born, or if there shall be no issue who shall live to attain the age or otherwise answer the description required for obtaining a vested estate by a preceding gift to such issue.

By the 30th section every devise of real estate (not being a right of presentation to a church) to a trustee or executor is to be construed to pass a fee simple, unless where a definite term of years or an estate of freehold less than the fee simple is expressly given to him. And by the 31st section trustees under an unlimited devise to them, when the trust may endure beyond the life of a person beneficially entitled for life, are to take the fee.

Devises (a term which applies to testamentary dispositions of real estate) and bequests (a term which applies to a testamentary disposition of personal property) contained in them are liable to failure from the death of the devisee or legatee before the testator, or to lapse, as it is termed. It is a general rule that words of limitation to heirs or executors superadded to a gift have no effect in preventing lapse in case of the devisee or legatee dying before the testator, for they are considered not as words of gift, but merely as indicating the legal devolution of the property. When the gift is to several persons as joint tenants, unless all of them die before the testator, there is no lapse. Two changes have been introduced into the law of lapse by the new act. The 32nd section enacts that devises of estates tail shall not lapse, but that where the devisee in tail dies during the lifetime of the testator, leaving issue, the devise shall take effect as if he had died immediately after the testator, unless a contrary intention appear by the will; and, by the 33rd section, gifts to children or other issue who shall die before the testator, having issue living at the testator's death, are not to lapse, but, if no contrary intention appear by the will, are to take effect as if the persons had died immediately after the testator. As a will of personalty formerly operated upon all the property of that kind belonging to the testator at the time of his decease, there could be no intestacy with regard to any part of the personal estate while there was a valid residuary bequest. The same will now be true of wills of real estate in which there is a valid residuary devise.

If an ambiguity exists on the face of a will, or, as it is technically termed, is patent, parol evidence cannot be admitted to remove it, because to admit evidence to explain what the will has left uncertain would be in effect to make a new will by parol. If the ambiguity is not apparent on the face of the will, but arises from circumstances disclosed when an attempt is made to carry the will

into effect, it may be removed by evidence of the same nature.

(Powell *On Devises*, and Jarman's *Notes* to Bythewood's *Precedents, Wills.*)

WILLAN, ROBERT, was born Nov. 12, 1757, at the Hill, near Sedbergh in Yorkshire, where his father was a medical man. He was brought up in the principles of the Society of Friends. In 1777 he went to the university of Edinburgh to study medicine. He graduated in 1780, and in 1782 settled in London. In 1783 the Dispensary in Carey Street was opened, and Willan was made physician. In 1785 he was admitted a licentiate of the College of Physicians. He was subsequently appointed Physician to the Finsbury Dispensary. In 1798 he published the first part of his great work, the 'Description and Treatment of Cutaneous Diseases,' but he did not live to complete this work. The subject of vaccination having excited great interest, Willan was induced to publish a volume on this subject out of the regular order of his work, and this appeared in 1806, with the title 'On Vaccine Inoculation.' He also left the materials for a work, published in 1817 by Dr. Bateman, entitled 'Delineations of Cutaneous Diseases.' Willan published also several papers in Journals and Transactions, upon various professional subjects. Willan was a fellow of the Antiquarian Society and Royal Society. He took an active interest in the establishment of the Fever Hospital, and was made one of its first physicians extraordinary. His health began to decline in 1810, and his friends persuaded him to embark for Madeira, where he died April 7, 1812.

WILLDENOW, CARL LUDWIG, was born in 1765, at Berlin, where his father was an apothecary. He received his early education at Berlin, and studied medicine at Halle, whence he proceeded to Langensalza. He took his degree of M.D. at Halle, and then returned to his native city. He early turned his attention to botany, and before he had graduated he published his 'Prodromus Floræ Berolinensis,' Berlin, 1787, 8vo. He took great interest in zoology, and in 1789 published his 'Tabellarisches Verzeichniss der in der Churmark Brandenburge einheimischen Schmetterlinge,' Berlin, 8vo. In 1792 he published his 'Grundriss der Kraüter-Kunde,' Berlin, 8vo, one of the best elementary works on botany of the day. The successive publication of various similar works obtained for him in 1798 the appointment to the chair of Natural History, and superintendent of the Botanic Garden at Berlin. The great work of Willdenow was his 'Species Plantarum' of Linnæus. He commenced this work in 1797, and continued publishing it at intervals till 1810. He died at Berlin, July 10, 1812.

WILLIAM I., King of England, styled THE CONQUEROR, was the illegitimate son of Robert, Duke of Normandy, and was born in 1027. He succeeded to the duchy of Normandy as William II., on the death of his father in 1035. On the death of Edward the Confessor of England, William laid claim to that kingdom. [EDWARD THE CONFESSOR; HAROLD II.] The defeat and death of Harold at the battle of Hastings, fought Oct. 14, 1066, decided the questio William's coronation took place in Westminst Abbey Dec. 25, from which day is dated the com mencement of his reign.

The Conqueror returned to Normandy in Marc 1067, leaving the government of England in th hands of two of his relations. In a few month insurrections broke out in various parts of th country. William returned from Normandy i December, and his first movement was again the city of Exeter, the headquarters of an in surrection which had broke out in the south west. At the head of it were the two ear Edwin and Morcar: they were compelled t make their submission. A second rising was a speedily put down; but in the course of th succeeding summer of 1069, first the thre surviving sons of Harold landed at Plymout from Ireland, in June, with a fleet, and then, i July, Canute the son of Sveno, the Danish kin appeared on the eastern coast at the head of much more formidable armament. The Iris invaders were driven back, but the Danes we joined by the inhabitants of Yorkshire and No thumberland, and a struggle ensued, in whic William came off victorious. From this tim William ruled his kingdom like a true conquero The natives of the country were reduced to a sta of complete slavery. All the offices, both in th church and the state, from the highest to th lowest, were, with scarcely an exception, fill with Normans and other foreigners. In 107 the Conqueror, having reduced all England submission, led a great army across the norther border to chastise the Scottish king, Malcol Canmore, who, in support of Edgar Athelin had been making aggressions upon the Englis dominions. William marched without resistan as far as Abernethy, where Malcolm met him, an made his submission. In 1075, during a visit William to Normandy, a number of his Angl Norman barons entered into a confederacy drive him from the throne. Their conspira being detected, they were hurried into an arm rising before their plans were mature, and the forces were dispersed. William, on his retur led a powerful army into Wales, and establish his dominion over that country. In order to pr vide against a threatened invasion in 1085 Canute, who had now succeeded Sveno as ki of Denmark, William revived the odious tax call the Danegelt.

The dispute between the Conqueror and h eldest son Robert, to whom he had promised, b afterwards refused, to resign his hereditary duch belongs to the latter years of his reign. A reco ciliation was at last effected by the intercession Queen Matilda. In 1087 a sarcasm uttered b Philip of France on the corpulency of Willia infuriated the Norman: he collected an army, an on the 10th of August attacked, took, and bur Mante, formerly belonging to Normandy. He w looking at the conflagration, in which many the inhabitants perished, when his horse stumbl on some hot embers, and threw him forward the pommel of the saddle, by which he was much injured that he died Sept. 9, 1087.

WILLIAM II., King of England, surnamed *Le Rouge* (the ruddy-faced), which the Latin chroniclers have inaccurately translated *Rufus* (the red-haired), was the second of the three surviving sons of William the Conqueror, and was born in Normandy in 1056.

On the death of his father he assumed the sovereignty of England, in defiance of the claims of his elder brother Robert, and was crowned at Westminster, Sept. 26, 1087. Robert, who at the time of his father's death was living in exile at Abbeville in France, immediately repaired to Rouen, where he was acknowledged as Duke of Normandy. An insurrection broke out afterwards in all parts of England, but was soon suppressed. This was followed by a revolt of many of the Norman barons against Duke Robert. After this civil war had gone on for some time, William landed in Normandy at the head of an army, Jan., 1091. But the two brothers did not try their strength in battle: Robert applied for protection to his feudal lord, Philip I. of France, and by his mediation a peace was concluded at Caen. In the latter part of 1091 William Rufus marched an army against Malcolm, king of Scotland; but Malcolm, without hazarding a battle, consented to do homage, and William returned to England. The Scottish war broke out again two years afterwards, when Malcolm was slain, Nov. 13, 1093. William made two campaigns, with little success, against the Welsh in 1094 and 1095. In 1096 Robert sold the duchy of Normandy to his brother William for 10,000*l.* While hunting in the New Forest, Aug. 2, 1100, he was shot dead by Sir Walter Tyrrell, as it was said, who, aiming an arrow at a deer, struck the king by accident; but the story rests merely on tradition. William Rufus was never married, and the genealogists have not assigned to him any natural children.

WILLIAM III. [NASSAU, HOUSE OF.]

WILLIAM (HENRY) IV., King of England, was the third son of King George III., and was born at Buckingham House, London, Aug. 21, 1765. In June, 1779, he was rated as a midshipman on board the Prince George, of 98 guns, under Rear-Admiral Digby. The Prince George soon after joined the Channel fleet, which, in the end of the year sailed to Gibraltar with supplies for the garrison. On the passage out a Spanish fleet of store-ships, under the convoy of 7 men-of-war, and afterwards a Spanish squadron of 14 ships of the line, were encountered, and several ships were taken. The Prince George was dispatched home with the prizes, and on the passage captured three French store-ships and a man-of-war. His royal highness was again in England by the beginning of May, 1780. In 1781 he served under Admiral Darby, and again under Digby in North America. In 1782 he served under Elphinstone (afterwards Lord Keith), and under Sir S. Hood. In 1783 he went to the Continent, where he passed two years, chiefly at the court of Berlin. In 1785 he was made lieutenant, and in 1786 captain of the Pegasus. He returned home without orders, for which, as a punishment, he was sent to the West Indies in command of the Andromeda, where he remained, principally at Jamaica, till the spring of 1789. In May, 1789, he was raised to the peerage, with the titles of Duke of Clarence and St. Andrew's and Earl of Munster; and an income of 12,000*l.* a year was settled upon him by parliament. The next year he was promoted to the rank of rear-admiral of the blue; he was made rear-admiral of the red in 1793, vice-admiral of the blue in 1794, vice-admiral of the red in 1795, admiral of the blue in 1799, and admiral of the fleet in 1801. During all this time however his royal highness remained without employment, living on shore as a private individual with Mrs. Jordan, the actress, with whom he had formed a connection in 1791, which lasted for 20 years, and produced a family of five sons and five daughters, of whom the eldest son was created Earl of Munster, in 1831. In 1797, he was appointed to the office of Ranger of Bushy Park, where he afterwards usually resided. The Duke of Clarence occasionally took part in the debates of the House of Lords. In his general politics he attached himself to the party of the Whig opposition. The ministry of 1806 raised his income and that of each of the other male branches of the royal family, from 12,000*l.* to 18,000*l.* per annum. On July 11, 1818, the duke was married at Kew, to the princess Adelaide Louisa Theresa Caroline Amelia, eldest daughter of George Frederic Charles, Duke of Saxe-Meiningen. Their union produced two daughters, both of whom died in infancy. Upon his marriage 6000*l.* was added by parliament to the income of his royal highness, and a farther increase of 3000*l.* a year was made on the death of the Duke of York in 1827. On the elevation of Mr. Canning to the premiership in April of this year, he placed the duke at the head of the Admiralty, as Lord High Admiral, but his royal highness only held the office till the following September, when he returned again to private life. The death of George IV., June 26, 1830, raised him to the throne.

The course of events during the reign of William IV. derived its direction in some degree from the political movements on the Continent of Europe. The revolution of the Three Days in Paris, the dethronement of Charles X., the transference of the French crown to the Duke of Orleans, and after the lapse of another month the commencement of the similar revolution in Brussels, which terminated in the separation of Holland and Belgium, was followed in England by much popular excitement. The new parliament, elected after the accession of the new king, met Oct. 26, 1830. The announcement of the resolution of the ministry to oppose a reform of parliament, Nov. 14, was followed by the resignation of the Duke of Wellington, Sir Robert Peel, and the other ministers; and within another week the Grey administration was in office under the banner of parliamentary reform. On March 1, 1831, Lord John Russell, moved in the House of Commons the first reading of the first Reform Bill. The second reading was carried by 302 votes against 301. But on April 20 ministers were beaten, and the parliament was dissolved. The

new parliament assembled on June 14, and the second reading of a second Reform Bill was carried in the House of Commons on July 4, by a majority of 367 to 251. The third reading was also carried by a large majority; but in the Upper House, on Oct. 3, the second reading was negatived by a majority of 199 to 158. On the 20th parliament was prorogued. A new session commenced on Dec. 6; and on the 12th Lord John Russell introduced the third Reform Bill, the second reading of which was carried on the 17th by a majority of 324 against 162. The third reading, March 19, 1832, was carried by 355 against 239. The second reading was carried in the House of Lords, April 13, by a majority of 184 against 175. But on May 7 ministers were defeated by a majority of 151 to 115, on Lord Lyndhurst's motion for postponing the consideration of the first (or disfranchising) clause of the bill; on which they immediately resigned. On the 17th Earl Grey and his friends were again in power; and on June 4 the Lords passed the bill by 106 voting for the motion and only 22 against it. Three days afterwards it received the royal assent, and became law.

The parliament which had passed the Reform Bill was dissolved on Dec. 23; and the first parliament elected under the new system of representation assembled Jan. 29, 1833. On the death of Earl Spencer in 1834, by which Lord Althorpe, the Chancellor of the Exchequer, was removed to the Upper House, his majesty sent for the Duke of Wellington, and directed him to construct a new ministry. On Dec. 9 Sir Robert Peel was gazetted as first lord of the treasury, the Duke of Wellington as foreign secretary, and the cabinet was completed by other names belonging to the Conservative or anti-reform party. On the 30th parliament was dissolved. On the day on which the New House of Commons assembled, Feb., 1835, ministers were beaten on the question of the speakership by a majority of 316 against 306. They continued in office till April 7, when Lord John Russell carried a motion against them on the Irish tithe question by 285 to 258. They resigned the next day, and on the 18th the Reform party were again in power, with Lord Melbourne as premier. Lord Melbourne's administration lasted for the remainder of the reign. Its most important measures were the several municipal reform acts. [MUNICIPAL CORPORATIONS.] William IV. died at Windsor, after a short illness, June 20, 1837. He was succeeded by Queen Victoria.

WILLIAM OF NEWBURY (in Latin Gulielmus Neubrigensis) is said to have been born at Bridlington, in 1136, and to have been properly called William Little, whence he sometimes designates himself Parvus, or Petit. His common name he derived from the monastery of Newburgh in Yorkshire, of which he was a member. Nothing more is known of his personal history, except that he appears to have been alive in 1220. He is known as the author of a Chronicle of England, which comes down to the year 1197. It was first printed in 12mo, at Antwerp in 1597, under the title of 'Gulielmi Neubrigensis Rerum Anglicarum Libri V.' There is an edition by Thomas Hearne, Oxon., 1719, 3 vols. 8vo.

WILLIAM OF MALMESBURY. [MALMESBURY.]

WILLIAM OF WYKEHAM. [WYKEHAM.]

WILLIAMS, JOHN, was born March 25, 1582. He entered as a student of St. John's, Cambridge in 1599. In 1605 he took the degree of M.A. He entered into holy orders in 1609, accepting a small living in Norfolk, and in 1611 he was instituted to the rectory of Grafton Regis in Northamptonshire. In the same year he was chosen chaplain to the lord chancellor Egerton, and in 1619 he was made one of the chaplains in ordinary to the king, who soon afterwards gave him the rich deanery of Salisbury, and in 1820 that of Westminster. In 1621 Williams was sworn in as lord keeper of the great seal. In the same month he was made Bishop of Lincoln. He remained lord keeper till the accession of Charles, when he was deprived of his office, and ordered not to attend in his place in the House of Lords, but he was not a man to be intimidated. He continued to sit, and exerted himself in promoting the Petition of Right. His rival Laud, in the Star Chamber, charged him with betraying the king's secrets, contrary to his oath as a privy councillor. He was convicted of subornation of perjury in defending himself from this charge, was fined 10,000*l.*, suspended from his offices, and condemned to imprisonment during the royal pleasure. At the meeting of the Long Parliament in 1640 he was released, and in the following year translated to the archiepiscopal see of York. He retired during the civil war to Aberconway in Wales, and held out Conway Castle for the king. He died, March 25, 1650.

WILLIAMSBURG. [VIRGINIA.]

WILLIS, BROWNE, an English antiquary, was born at Blandford, Sept. 14, 1682. After passing through Westminster School, he entered Christ Church, Oxford, as gentleman-commoner. On the Society of Antiquaries being revived, 1717–18, he became a member of it, and in 1740 the degree of LL.D. was conferred upon him by the university of Oxford. He died Feb. 5, 1760.

His greatest and most important work is his 'Survey of the Cathedrals of England,' 3 vols. 4to., 1727, 1730, and 1733. Of his 'Notitia Parliamentaria,' the conclusion was not published till 1750, although the first part had been printed in 1715.

WILLOW-HERB, the common name of the plants belonging to *Epilobium*, an extensive genus in the natural order *Onagraceæ*. *E. angustifolium*, Narrow-Leaved Willow-Herb, is found in moist shady places in the north of England and in the south of Scotland.

WILLOWS. [SALIX.]

WILLUGHBEIA, a small East Indian genus of the natural family of *Apocynaceæ*.

WILLUGHBY, FRANCIS, the only son of Sir Francis Willughby, Knight, was born in 1635. He was admitted at Trinity College, Cambridge, and took his degree of B.A. in 1656, and of M.A. in 1659. Here he became a pupil of Ray, and a friendship was soon formed between them.

Shortly after 1660 Ray refused to sign the Act of Uniformity, and was obliged to resign his fellowship and leave Cambridge. The consequence was that the two friends made a tour on the Continent, visiting France, Spain, Italy, Germany, and the Low Countries, with the object of gaining all possible information on natural history. They returned laden with materials which Willughby commenced working at, with the intention of publishing a large work on the animal kingdom. But he died, in the midst of his labours and in the prime of life, July 3, 1672. He left his works to be published, and Ray became their editor. He also appointed Ray one of his executors, and committed to him the education of his two sons, for which Willughby left him 60*l.* a year.

The first work edited by Ray after Willughby's death was his Ornithology, with the title 'Ornithologiæ Libri Tres,' London, 1676, folio. This work was translated into English by Ray, and the plates republished, in 1678. In 1686 Ray edited a second work on the same plan, embracing the fishes. This was published at London, in folio, with the title 'Historiæ Piscium Libri Quatuor.'

Willughby and Ray were early Fellows of the Royal Society of London, and Willughby contributed some papers to the 'Philosophical Transactions' before his death; to which Ray afterwards added several papers on insects, of which the substance had been prepared in Willughby's manuscripts.

WILMINGTON. [Delaware.]

WILMOT, JOHN, EARL OF ROCHESTER, was born at Ditchley, Oxfordshire, April 10, 1648. He was the son of Henry, earl of Rochester. He was educated at Wadham College, Oxford, where he was placed under Dr. Blandford, afterwards bishop of Oxford and of Worcester, but he relinquished his studies at an early age, and set off upon his travels in France and Italy. He afterwards served in the navy under the Earl of Sandwich and Sir Edward Spragge. He is said to have entered upon a court life free from habits of intemperance, but his youth, his convivial disposition, his wit, and the contagious example of a profligate court, soon led him into excesses, under which his constitution gave way. Before his death he besought Dr. Burnet to publish, for the good of the world, a history of his sins, his sufferings, and repentance. He died July 29, 1680. In the same year Burnet published 'Some Passages in the Life and Death of the Earl of Rochester.' Rochester wrote a few poems, some of which are indecent, some satirical, and some witty, of which one of the best is the poem 'On Nothing.'

WILNA, a government of West Russia, situated between 53° 35′ and 56° 24′ N. lat., 21° 5′ and 26° 40′ E. long., is bounded N. by Courland, E. by Vitepsk and Minsk, S. by Grodno and Poland, and W. by Prussia and the Baltic. Its area is 16,250 square miles, and the population in 1846 was 863,700.

The surface presents an extensive and rather elevated plain, diversified by forests and hills, the highest of which do not rise more than 300 feet above the sea; in the low grounds are many marshes and bogs. Some districts are too sandy for vegetation, but in many parts there is a rich mould productive of all kinds of grain and useful plants. Here and there are found blocks of granite, and fossil bones of elephants and other animals. The progress of cultivation has thinned the forests, but there are still woods of great extent. There are many lakes; most of the rivers are tributaries of the Niemen, which forms the south-western boundary of the province. The Düna bounds the province for a short distance on the N.E. The Wilia is the principal river; it rises in Minsk, is joined by the Narocs and the Swienta, and falls into the Niemen at Kowno. The Dange, the Vindau, and the Beresina, rise in the province. The winters, though short, are very cold; the spring is long and humid; the autumn and summer wet and foggy.

Agriculture is the chief occupation of the inhabitants. Rye is the principal grain crop; barley, wheat, oats, buck-wheat, peas, beans, hops, flax, and hemp are likewise grown, and a considerable quantity exported.

The peasants have only poor ill-fed beasts, horses as well as oxen, cows and sheep, and a few geese and common fowl. On the estates of the nobles the cattle are in a better condition, and there is a good breed of small but spirited and hardy horses, which are in great request for the Russian light cavalry. Bees are kept in great numbers, and the quality of the honey is very superior. The forests not only furnish large quantities of timber and fuel, but supply material for building every year about 3000 craft for the navigation of the Düna, Wilia, and Niemen, which never come back. Charcoal, pitch, tar, potashes, and lamp-black are made. Deer, wolves, bears, gluttons, foxes, martens, and squirrels abound; in a wooded valley near Letewik there are still some wild bulls (urus), which no one is allowed to kill without special permission from the government.

The minerals are bog-iron, saltpetre, marble, granite, sandstone, jasper, agates, and chalcedony. The manufactures are unimportant, being entirely of a domestic kind. The exports, consisting of the produce already named, are sent partly to Riga on the Düna, still more by land-carriage to Libau, and a considerable quantity by the Niemen to Prussia. The inland trade is almost exclusively in the hands of the Jews, who are a scourge to the farmer. Education is in a backward state. The bulk of the population is Lithuanian, a race distinct from Slavonian and Gothic, with a language near akin to Sanscrit.

Wilna, the capital formerly of Lithuania, now of the government of Wilna, is situated in 54° 43′ N. lat., 25° 10′ E. long., at the conflux of the rivers Wilia and Wileyka, and is surrounded with picturesque hills. On an eminence called the Castle Hill are ruins of an immense palace of the Jagellons. The town-hall, the arsenal, the palace of the government, and some palaces of the nobility, are handsome buildings. Among the churches the cathedral, built in 1367, and dedicated to St. Stanislaus, is the most worthy of

notice. There are in all 40 churches, several synagogues and a mosque. The university of Wilna, founded as a college of Jesuits in 1578, was founded anew by the late Emperor Alexander, and was in a very flourishing condition till 1832, when, in consequence of the Polish revolution in 1830, it was suppressed, and its library of 200,000 volumes transferred to St. Petersburg. There remain a medico-chirurgical academy, a botanic garden, an observatory, and a theological seminary. There are no manufactures of importance, but a considerable trade. The population is 58,000, of whom nearly one-half are said to be Jews. *Troki* is situated on a lake 17 miles W. of Wilna, and has 4000 inhabitants. *Kowno* is a considerable town, situated at the conflux of the Wilia and the Niemen, and surrounded on all sides by those rivers: it was here that the main body of Napoleon's army entered Russia. *Kreidany*, with 6000 inhabitants, is a very respectable town; all the houses however are of wood.

WILSON, RICHARD, R.A., was born at Pinegas in Montgomeryshire, in 1713. He showed very early a taste for drawing, and was placed with a portrait-painter named Wright, in Covent Garden, London. After practising some time with success as a portrait-painter in London, he went to Italy in 1749. From Venice he went to Rome, and while there was visited by Vernet, the celebrated French landscape-painter, who was so much struck with a landscape of Wilson's that he offered to make an exchange with him of one of his own landscapes for it, which was readily assented to by Wilson.

From this time he devoted himself to landscape, and soon acquired so great a reputation, that he had many scholars even while at Rome. Wilson did not copy the works of celebrated masters, but confined his studies to nature.

He returned to London in 1755, after an absence of six years. In 1760 he exhibited, in the great room at Spring Gardens, his picture of Niobe. He was one of the first members of the Royal Academy, which was founded in 1768, and of which, in 1770, he was appointed librarian, an office of small emolument, yet solicited by Wilson; for though a few discriminating connoisseurs purchased some of his best pictures, he was neglected by the public, and was in a state of indigence compared with the majority of his fellow-members of the Academy. Many of the academicians had a personal dislike to him, among whom the president Reynolds was the foremost. The friends of Reynolds attribute this to Wilson's uncouth manners.

Wilson was generally so unfortunate in the sale of his works, that when one met with a ready sale and more than usual attention, he repeated it; and he painted some subjects as many as four and even five times, making only very slight alterations: he painted five pictures of Mæcenas's Villa at Tivoli, and two of the Niobe; one Mæcenas's Villa, and one Niobe, are now in the Vernon Collection of the National Gallery. The figures in his landscapes are not all painted by himself; he occasionally availed himself of the assistance of Mortimer and Hayman.

Wilson changed his residence very often; his last residence in London was a mean house in Tottenham Street, Tottenham Court Road, of which he had the first and second floors, where he lived almost without furniture. The last two or three years of his life however were spent in affluence, owing to some property which he inherited from a brother. He retired to a village in Denbighshire, where he died in 1782, aged 69, and was buried in the churchyard of Mold.

In 1814 about seventy of Wilson's pictures were exhibited, with some other works, at the British Institution.

WILSON, ALEXANDER, was born at Paisley, Scotland, July 6, 1766. In 1779 he was bound apprentice to a weaver for three years, on the expiration of which he worked four years as a journeyman, and afterwards spent nearly three years as a pedlar. From an early age he wrote poetry, and some of his pieces appeared in the newspapers. In 1792 he published anonymously his 'Watty and Meg,' which some at first ascribed to Burns to the no small gratification of Wilson. In 1794 Wilson emigrated to the United States, and in July of that year landed at Newcastle in the State of Delaware, with only a few shillings in his pocket, and immediately proceeded to Philadelphia. After trying various occupations he ultimately turned schoolmaster, and in 1802 he made a contract with the trustees of a school at Gray's Ferry, on the river Schuylkill, about four miles from Philadelphia, and here he became acquainted with Mr. Bartram, the botanist and naturalist, and with Mr. Lawson, the engraver, who gave him instruction in drawing birds, in which he succeeded beyond the expectation of his friends; and from that time the ruling passion of his after-life was brought into play. All the time he could spare was devoted to the examination of birds, and making drawings of them in colours. In 1806 Mr. Bradford, bookseller, of Philadelphia, being about to publish a new edition of Rees's 'Cyclopædia,' engaged Wilson as assistant editor. Soon afterwards he explained to Bradford his views of a large work on American ornithology, and the bookseller undertook the publication. In Sept. 1808, the first volume of the 'American Ornithology' was published in folio, with plates carefully engraved from Wilson's own drawings, coloured after nature, and with admirable letter-press descriptions. The second volume was published in 1810, and soon afterwards he set out for Pittsburg on a journey to New Orleans. From Pittsburg he descended the Ohio by himself in a skiff. He started on February the 24th, and on March 17 moored his boat in Bear Grass Creek, at the rapids of the Ohio, after a voyage of 720 miles. He had made excursions from the banks of the river, as he proceeded, with his gun and drawing materials, in search of new species of birds, of which he made drawings and wrote descriptions on the spot where he shot them. He afterwards walked from Louisville to Lexington, 73 miles, and on the 4th of May set out from Nashville for St. Louis through the wilderness on horseback. On the fourteenth day he arrived at Natchez, in Mississippi, after a journey through

swamps and across rivers, which had nearly killed both his horse and himself. The other volumes of his work were brought out in succession, with astonishing rapidity and regularity. The number of his subscribers increased, and before his death included perhaps every royal personage in Europe. In 1812 he was elected a member of the American Philosophical Society. In 1813 he published the 7th volume. He had completed the pictorial materials for the 8th and 9th when he was carried off by an attack of dysentery in his 48th year. He died Aug. 23, 1813, at Philadelphia. The 8th and 9th volumes were completed and published in 1814 by Mr. George Ord, who had been his companion in many of his exploring expeditions. Mr. Ord supplied the letter-press descriptions for these two volumes, as well as a biography of Wilson in the 9th. Three supplemental volumes were afterwards supplied by Charles Lucien Bonaparte, folio, 1825–1828.

WILSO'NIA, a genus of plants belonging to the natural order *Convolvulaceæ*.

WILTON, JOSEPH, R.A., sculptor, was born in London in 1722; and when of a sufficient age, was sent abroad, and studied at the various towns in Brabant, at Paris, and at Rome, where in 1750 he was presented with the Jubilee gold medal by Benedict XIV. He returned to England in company with Cipriani, Chambers the architect, and a clever modeller of the name of Capizzoldi, who assisted him in some of his works. When the Duke of Richmond opened a gallery for students in art, in Spring Gardens, he appointed Cipriani and Wilton the directors of it. Of his public works the principal are—the monument to General Wolfe in Westminster Abbey, of Admiral Holmes, of the Earl and Countess of Montrath, and of Stephen Hales. He made busts of Bacon, Cromwell, Newton, Swift, Wolfe, Chatham, Chesterfield, and many others. All his works were admirably worked in the marble, but he showed little taste in his compositions. He made a large fortune and lived in great style. He died in 1803.

WILTON. [WILTSHIRE.]

WILTSHIRE, an inland county of England, is bounded N.W. and N. by Gloucestershire, N.E. by Berkshire, E. and S.E. by Hampshire, S. and S.W. by Dorsetshire, and W. by Somersetshire. The county is of compact form, approximating to a quadrangle. There are several small detached portions, surrounded by the adjacent counties of Gloucester and Berks. The county, exclusive of its detached portions, is situated between 50° 55′ and 51° 43′ N. lat., and between 1° 29′ and 2° 21′ W. long. The greatest length N. to S. is 54 miles; the greatest breadth E. to W. is 37 miles. The area is 1367 square miles. The population in 1841 was 258,733.

Surface and Geology.—The geological formations of Wiltshire consist chiefly of the cretaceous and oolitic series, with the intermediate beds. In the south-eastern corner the chalk is covered with the tertiary formations of the chalk-basin of the Isle of Wight. The chalk formation, which may be considered from its extent as the most striking geological feature of the county, forms the extensive downs which overspread the eastern, central, and southern parts. The great central chalk district is divided into two parts by the vale of Pewsey, where the green-sand occupies the bottom of the valley, and is skirted on each side by the chalk-hills. As this valley extends E. and W., it divides the chalk district into two portions, of which the Marlborough Downs belong to the northern portion, and Salisbury Plain to the southern. The southern part of the county is occupied by the chalk which extends E. into Hampshire and S. into Dorsetshire, and forms an extensive hilly tract furrowed by the valleys of the Nadder, the Wiley, the Avon, and the Bourn, which valleys unite near Salisbury to form the valley of the Lower Avon. S. and E. of Salisbury the chalk is covered with the plastic clay formation belonging to the chalk-basin of the Isle of Wight. That portion of the southern chalk district known as Salisbury Plain, forms an elevated platform, uncultivated and unenclosed, except in the valleys. Wide downs, covered by a scanty herbage, spread in every direction. The population is collected in the valleys, where, along the streams which water them, the villages stand very close.

The green-sand formation, comprehending the chalk marl with the green-sand, crops out from beneath the escarpment of the two chalk districts occupying the vale of Pewsey, which separates them, as well as the indentations in the boundary of the southern chalk district.

From beneath the outer edge of the green-sand formation the Weald clay, or Tetsworth clay, which usually separates the green-sand from the iron-sand, crops out. The iron-sand does not appear in this county, except in a few places; and in the absence of the iron-sand, the Weald clay rests along its northern and north-western borders on the Kimmeridge clay, which belongs to the uppermost division of the oolitic group.

The formations already noticed occupy the whole of the county S.E. of a line drawn from the Berkshire border near Swindon, to the Somersetshire border near Westbury, the whole line making a convex circuit from N.E. to S.W. Beyond this boundary the strata of the middle oolites and lower oolites, comprehending the coral-rag, calcareous grit, Oxford clay, cornbrash, forest marble, and a deep bed of clay, occupy all the N. and N.W. part of the county.

Rivers and Canals.—This county is comprehended in the three basins of the Thames, the Severn, and the Wiltshire Avon. The upper part of the course of the Thames is in Wiltshire. [THAMES.] The Kennet and some smaller affluents of the Thames rise in this county.

The Wiltshire Avon, sometimes called the Upper Avon, rises in the southern slope of the northern chalk district, in the neighbourhood of Devizes, and flows E.S.E. along the vale of Pewsey to Rushall, near which village it is joined by another stream, and the Avon then flows S. to Salisbury, where it is joined on the right by the Wiley (united with the Nadder). It is joined a little lower down, on the left bank, by the Bourn, and still lower by another stream on the right. The Avon then flows S. to Downton,

a mile below which it quits the county: its length from the neighbourhood of Devizes to the border of the county is 41 miles: its further course into the English Channel at Christchurch is about 25 miles; making 66 miles in all.

The Wiley rises in the downs north of Mere, in the S.W. part of the county, and flows N.E. and then S.E., and having received the Nadder near Wilton on its right bank, flows E. to its junction with the Avon at Salisbury. Its whole length is about 27 miles.

The Bourn rises just within the northern boundary of the southern chalk district, and flows S. to the E. side of Salisbury, where it joins the Avon: its whole length is about 23 miles.

A very small part of the county about Mere, in the south-western corner, is drained by the upper waters of the Dorsetshire Stour, which rises at Stourhead in this county. The Stour and the Wiltshire Avon unite just above their outfall into the English Channel at Christchurch.

That part of the county which belongs to the basin of the Severn is drained by the Bristol Avon, the source of which is in the Cotswold Hills, at Horton in Gloucestershire. It flows S.E., S., and E., through the N.W. part of Wiltshire, to Bradford, near which it enters Somersetshire. [SOMERSETSHIRE.]

The navigation of the Thames, the Kennet, and the Bristol Avon, does not commence until after those rivers have quitted the county; but the want of river-navigation is partially supplied by canals, of which three lines are connected with this county.

The northernmost line is that of the Thames and Severn Canal, which extends from the Thames at Lechlade in Gloucestershire to the Stroudwater Canal at Stroud in the same county, connecting the rivers Thames and the Severn. The second line is that of the Kennet and Avon Canal, which also connects the Thames with the Severn, by means of their respective tributaries the Kennet and the Bristol Avon. This canal is 57 miles long. The third line is that of the Wilts and Berks Canal, which lies between the two lines already noticed, and connects the Thames near Abingdon with the Kennet and Avon Canal at Semington, between Devizes and Bradford. Its whole length is 52 miles.

Railways.—The Great Western Railway passes through the N.W. part of Wiltshire from Swindon to Bath. A branch from Swindon extends N.W. past Stroud to the Bristol and Birmingham Railway, and a branch from Chippenham extends S.S.W. to Trowbridge. A branch from the South-Western Railway extends W. by N. past Romsey to Salisbury.

Agriculture.—In an agricultural point of view Wiltshire may be divided into two districts, a southern district comprehending all the Wiltshire Downs, with their intersecting valleys, and separated from the northern by an irregular line running round the foot of the chalk-hills from their entrance from Berkshire near Swindon on the N.E., to their termination near Westbury on the S.W.

The soil on the downs varies little, being thin, and uniformly resting on the chalk. It produce excellent short herbage, very well suited for shee pasture. The proportion which has been con verted into arable land is comparatively small and chiefly on the borders of the valleys. As w descend from the downs into the valleys, the soi generally becomes less mixed with flints and of more loamy nature, in consequence of the water washing down portions of the upper soil, of whic the finer particles are deposited on the sides of th hills, and form what is called white land. Th level part of the valleys nearest the rivulets con sists of flints washed down lower, and mixed wit fine earth.

As the cows in this district are not such object of attention as the sheep, the breeds are ver various, and few of them of superior quality.

The Wiltshire sheep are a variety of the Sout Down, but not in general so pure. The origina breed was horned, but this has been almos entirely superseded by the polled breed, whic produces a finer wool, if not so large a carcass Of late the size has been an object to the breeder since fine wool has much diminished in value.

The north-western district of Wiltshire differ greatly from the southern district. The subsoil i this part of the county, instead of being chalk consists chiefly of flat broken stones. The top soi is a reddish calcareous loam mixed with irregula flat stones. In some places a stratum of clay i interposed between the rock and the top soil Where the top soil is thin, it is chiefly cultivate as arable land; where it is deep and rich, there are some of the finest pastures in England, such as those about Chippenham, and thence southward to Melksham and Trowbridge, where the larges oxen may be fatted.

This district is essentially a dairy country The buildings are well suited to this purpose, and placed conveniently with respect to the surround ing fields. The grass land forms the greater por tion of the N.W. part of Wiltshire, and the cheese made there is justly celebrated. It is mostly bought up by factors for the supply of Londo and other large towns.

Divisions and Towns.—Wiltshire is divided into 28 hundreds. It is partly in the diocese o Salisbury, and partly in that of Gloucester and Bristol. It is in the Western Circuit. The spring assizes are held at Salisbury, the summer assizes at Devizes. For parliamentary purposes it i divided into North Wiltshire and South Wilt shire, each of which returns 2 members; besides which Salisbury, Chippenham, Cricklade, Devizes and Marlborough, return each 2 members; and Calne, Malmesbury, Westbury, and Wilton, re turn each 1 member: total, 18 members.

The following are the principal towns, with the population of each in 1841:—

Amesbury, 7 miles N. from Salisbury, on the E. bank of the Avon, is a place of great antiquity, and contains an ancient church. The market formerly established here has been discontinued. Population of the parish, including the hamlet of West Amesbury, 1171.

Great Bedwin, a village, 25 miles N.N.E. from Salisbury, consists chiefly of two streets crossing

each other at right angles. It was a parliamentary borough, but was disfranchised by the Reform Act. The church is ancient, the nave being of Norman architecture, and the chancel of Early English. Population of the parish, 1001. The village of *Little Bedwin* is about a mile N.N.E. from Great Bedwin.

Bradford, a market-town, 30 miles N.W. from Salisbury, is situated on the N. bank of the Bristol Avon, which is here crossed by two bridges. The town consists chiefly of three streets on the acclivity of a hill. The Kennet and Avon Canal passes on the south side of the river. Fine broad-cloths are manufactured. There is a church, and there are three or four places of worship for dissenters. Population, 3836.

Calne, a market-town, municipal borough, and parliamentary borough, 30 miles N.N.W. from Salisbury, stands on the Calne brook, which having received two small affluents above the town, is below it called the Marden, and flows into the Bristol Avon. The houses are substantially built of stone, and the streets are lighted with gas. The town contains a town-hall, a church, and places of worship for dissenters. A branch from the Wilts and Berks Canal comes to the town. The parliamentary borough formerly returned two members. It now returns one. The municipal borough is governed by 4 aldermen and 12 councillors: population, 2483. Population of the parliamentary borough, 5100.

Chippenham, a market-town, municipal borough, and parliamentary borough, 5 miles W. by N. from Calne, is situated on the Bristol Avon, which flows round the town on the N. and W. There is a bridge over the Avon. The houses are generally well built, and the streets are paved, and lighted with gas. The town contains a modern market-house, an ancient church, and four or five places of worship for dissenters. The Great Western Railway passes by the town, and a branch from the Wilts and Berks Canal comes to it. The municipal borough is governed by 4 aldermen and 12 councillors: population, 1875. The parliamentary borough returns 2 members: population, 6606.

Corsham, formerly a market-town, 4 miles S.W. from Chippenham, consists of a long street of stone houses, with a market-house in the centre. The church is large and ancient, with a tower and spire. Population of the parish, 3842.

Cricklade, a market-town and parliamentary borough, 17 miles N.N.E. from Calne, stands on a level tract, on the S. bank of the Thames. The town contains two parish churches, St. Mary's, which has some remains of Norman architecture, and St. Sampson, which is a large gothic structure, with a lofty embattled tower, with pinnacles, and highly ornamented with niches and pedestals. There are three chapels for dissenters, and a union workhouse. The Thames and Severn Canal passes near the town, and a branch canal passes through it, and joins at Swindon the Wilts and Berks Canal. Population of the two parishes, 2128. The parliamentary borough returns 2 members: population, 34,381.

Devizes, a market-town, municipal borough, and parliamentary borough, 22 miles N.W. by N. from Salisbury, is situated near the centre of the county, on an elevated site, and consists of several streets of good houses, well paved, and lighted with gas. It contains a modern town-hall, a union workhouse, and two ancient parish churches. St. John's church has an embattled tower and very handsome chancel. There are four or five places of worship for dissenters. The municipal borough is divided into 2 wards, and is governed by 6 aldermen (of whom one is mayor) and 18 councillors: population, 4631. The parliamentary borough returns 2 members: population, 6156.

Downton, formerly a market-town, 6 miles S.S.E. from Salisbury, consists chiefly of a long straggling street on both sides of the Wiltshire Avon. The church is large and ancient, with a central tower. Population, 2538.

Heytesbury, formerly a parliamentary borough, 17 miles N.W. by W. from Salisbury, is situated in a valley on the N. bank of the Wiley, and consists of streets irregularly laid out. The church is a large cross church, with a central tower. Population of the parish, 1311.

Highworth, a market-town, 6 miles N.N.E. from Swindon, is situated on a hill, on the road between Lechlade and Swindon. The church is ancient. Population of the town, 891.

Hindon, a market-town, 15 miles W. by N. from Salisbury, consists of one principal street and three shorter ones. The church is a plain building. Population of the parish, 772.

Lavington (*East* or *Market*), 18 miles N.N.W. from Salisbury, is situated in a valley on the N.W. side of Salisbury Plain; the two principal streets cross each other at right angles. The church is of the later or perpendicular architecture. Population of the parish, 1115.

Ludgershall, 15 miles N.N.E. from Salisbury, is in a pleasant situation. The streets are neither paved nor lighted. The church is of irregular form, and has a low square western tower. It was a parliamentary borough, but was disfranchised by the Reform Act. Population of the parish, 554.

Malmesbury, a market-town and parliamentary borough, about 20 miles N.N.W. from Devizes, stands on a piece of land formed by the junction of the Bristol Avon and a stream from Tetbury called the Newnton Water, and consists of some streets irregularly laid out, but paved and lighted. There are two bridges over the Avon, and two over the stream from Tetbury. There was formerly a large abbey at Malmesbury. There are now two churches—the Abbey church and St. Mary's, and the remains of a third—old St. Paul's. The Abbey church was, at the dissolution, purchased by the inhabitants, and made parochial. It was a magnificent building, but much of it has fallen, and the part now used stands in the midst of the remains and ruins of the original structure. The lofty tower of St. Paul's is still standing and is used as a belfry. There are places of worship for dissenters. Population of the parish, 2367. The parliamentary borough returns one member: population, 6647.

Marlborough, a market-town, municipal borough, and parliamentary borough, 28 miles N. by E. from Salisbury, stands on the N.W. bank of the Kennet, over which there are four bridges. The town consists chiefly of one wide street lined with houses irregularly built, and many of them old. Most of the houses are of brick. The market-house is an ancient building, having in its upper story a council-chamber, assembly-rooms, and court-house. There are two churches: St. Mary's is an old church with a tower at the west end, with a Norman doorway enriched with zigzag ornaments; the church of St. Peter and St. Paul has a lofty square tower. There are places of worship for dissenters. In 1843 a college was founded for 500 pupils, of whom two-thirds must be sons of clergymen; it has seven exhibitions. The municipal borough is governed by 4 aldermen (of whom one is mayor) and 12 councillors: population, 3391. The parliamentary borough returns 2 members: population, 4139.

Melksham, a market-town, 7 miles W. by N. from Devizes, consists principally of one long irregular street, chiefly along the road from Bath to Devizes, but partly on the road to Westbury. The principal part of the town is divided by the Bristol Avon, over which is a stone bridge of four arches, from a suburb called the City. The houses, which are of stone, are of neat appearance; and the main street is paved and lighted with gas. The church has some portions of Norman architecture, and has a handsome central tower, and two chantry chapels on the south side. Population of the town, 992.

Mere, a market-town, 22 miles W. from Salisbury, consists chiefly of one street of indifferent houses, irregularly built along the road from Salisbury to Exeter. The church is a handsome gothic building, chiefly of perpendicular character, with a western tower. Population of the town, 1719.

Salisbury is the capital city. [SALISBURY.]

Sarum. [SARUM.]

Swindon, a market-town, about 36 miles N. from Salisbury, and 2 miles E. from the Swindon station on the Great Western Railway, is situated on a hill commanding an extensive prospect, and consists of several streets irregularly laid out. The parish church is of mean external appearance, but neatly fitted up within. There are two or three places of worship for dissenters. Population of the parish, 2172.

Trowbridge, a market-town, is situated on the acclivity of a rocky hill on the N.E. bank of the Were, a tributary of the Bristol Avon. It consists of several streets, irregularly laid out, paved, and lighted with gas. The houses are chiefly of stone; and generally old and of mean appearance. The church is a spacious edifice, with a nave, chancel, two aisles with chapels attached to their eastern extremities, a north and a south porch, and a large western tower and spire. There is a chapel-of-ease in the town, and another at Staverton, also in the parish, about two miles north of the town. There are several places of worship for dissenters. The principal branch of industry at Trowbridge is the manufacture of broad-cloth and kerseymere, especially the latter. Trowbridge is the largest clothing town in the county and on of the largest in the west of England. A branch fro the Great Western Railway extends from Chippe ham through Melksham to Trowbridge, and th Kennet and Avon Canal passes the town at th distance of one mile to the N. Population of th parish, 10,822.

Warminster, a market-town, 20 miles W.N.W from Salisbury, stands in a healthy situation, clo to the western border of Salisbury Plain, in th valley of the Wiley, about a mile N. from th river; it consists of several streets, the princip street extending along the road from Salisbury Frome. The general appearance of the town neat and respectable. The parish church spacious and handsome; the tower is of the tim of Edward III., the rest of the church was rebui early in the last century. There is also a moder church; and there is a chapel in the centre of th town, founded as early as the time of Edward and now used as a chapel-of-ease. There ar several places of worship for dissenters. There a handsome town-hall erected by the Marquis Bath, with a handsome suit of rooms for assem blies, public meetings, &c. Population of th parish, 6211.

Westbury, a market-town and parliamentar borough, 4 miles N. from Warminster, consists one long crooked street and of some smaller street irregularly laid out. Westbury Leigh forms an other street, separated by an interval of open roa from the principal street of Westbury. The churc is a large ancient building, with a central towe A handsome town-hall was erected in 181 Population of the township of Westbury, 3631 of the township of Leigh, 1380. The parlia mentary borough returns one member: popula tion, 7454.

Wilton, a market-town and parliamentar borough, 3 miles W. by N. from Salisbury, stand on the S.W. bank of the Wiley, just above th junction of the Nadder with the Wiley. Th town consists chiefly of one long street. Th church, formerly the abbey church, consists of th nave and western tower, which are ancient, sid aisles of the Elizabethan period, and a chancel o modern date. There is also a church erected a the expense of the Hon. Sidney Herbert, an completed in 1843, in the Italian style of archi tecture, with a separate bell-tower, or campanile which is connected with the church by a vestibul or cloister. The manufacture of carpets, for whic Wilton was formerly celebrated, has fallen of The town-hall is an ancient plain brick building Near the town is Wilton House, the seat of th Earl of Pembroke, a mansion of imposing appear ance, standing in a noble park and gardens. Th house contains a fine collection of paintings an antiquities, and a valuable library. Population o the parish, 1698. The parliamentary borough returns one member: population, 8057.

Wootton-Basset, a market-town, 17 miles N. by E. from Devizes, stands on an elevated site, an consists chiefly of one street, built chiefly of brick and thatched. The church is an ancient structure in the centre of the town. Wootton-Basset wa a parliamentary borough, but was disfranchised

by the Reform Act. Population of the parish, 2990.

History and Antiquities.—It is difficult to determine exactly to which of the ancient British nations the various parts of Wiltshire belonged. A large portion, there can be no doubt, belonged to that nation or those nations who are mentioned by Ptolemæus under the generic name of Belgæ (Βέλγαι). After the departure of the Romans, Wiltshire was the scene of contest between the Britons and the Saxons. The scene of the asserted massacre of the British nobles by Hengist is placed on Salisbury Plain; but both the event itself and its locality are doubtful.

Several Roman roads crossed the county in different directions, and many Roman antiquities have been found. Of the antiquities not Roman the most important are Avebury and Stonehenge. *Stonehenge* is an assemblage of large stones, situated on Salisbury Plain, about 3 miles W. by N. from Amesbury. The stones are partly unhewn and partly squared, and seem to have been originally arranged in three circles. The largest stones are from 16 to 21 feet high. Several of the stones are upright, with similar stones placed as imposts horizontally on the tops, and connected by two tenons on the upright stones let into two mortices of the horizontal stones. The impost-stones appear to have been originally continued round the entire circle. Several of the stones have fallen, and others are in a sloping position. On Salisbury Plain, W. of Stonehenge, are numerous tumuli. The camps and other earthworks are also numerous: they are described in Sir R. C. Hoare's 'Ancient Wiltshire.'

WIMBLEDON. [Surrey.]

WIMBORNE MINSTER. [Dorsetshire.]

WINCANTON. [Somersetshire.]

WINCH AND AXLE, a machine constituting a small windlass, and consisting of a cylinder of wood which is capable of turning on its axis between two upright posts of the same material, or between the ends of a cast-iron frame. A lever at one or at each extremity of the cylinder is attached to an iron axle which passes through the cylinder, and is turned at right angles to its direction, and again turned, so as to furnish a handle parallel to the cylinder. When of a simple form it is employed to raise water from a well, earth from the shaft of a small mine, &c.: but when the cylinder or barrel is turned by the intervention of toothed wheels and pinions, in which case the machine is called a *Crab*, it is frequently employed to raise casks or heavy packages from the ground to the upper part of a building. [Wheel and Axle; Windlass.]

WINCHCOMB. [Gloucestershire.]

WINCHELSEA. [Sussex.]

WINCHESTER, in Hampshire, a city, municipal borough, parliamentary borough, and the see of the bishop, is 67 miles S. W. from London by the South-Western Railway.

Winchester is one of the most ancient towns in England. The Romans, by whom it was first subdued, named it *Venta Belgarum;* the Saxons, who were the next possessors, named it *Witanceaster,* which has become Winchester.

Winchester appears to have flourished under the Romans as long as they remained in the island. In 519 it was conquered by Cedric, who afterwards made it the seat of his government, and it continued to be the capital of the West Saxon kings till Egbert, the first king of the whole heptarchy, was crowned there, and then it may be said to have become the metropolis of England. It continued to be the capital of successive Saxon kings till 1013, when Sweyn, the Danish king, obtained possession of England, and Winchester became the seat of his government. After his death London became the capital of Canute, and Winchester of Edmund Ironside, till Edmund's death in 1016, when Canute became sole king, and Winchester the sole capital.

After the Norman conquest Winchester continued to be the capital, and during the reign of Henry I. attained the summit of its prosperity. It was surrounded by walls; was defended by a castle built by William the Conqueror on the west, and by another subsequently erected for the residence of the bishop, on the east. The suburbs extended a mile from the walls in every direction.

While King Stephen was a prisoner in Gloucester Castle a contest commenced between his queen and the Empress Matilda, aided by their respective partizans, which was carried on for several weeks in the streets of Winchester, at the termination of which nearly the whole of the town north of the High Street, the royal palace, the Abbey of St. Mary, Hyde Abbey, and about forty churches, were destroyed. Henry II. resided much at Winchester; he rebuilt the palace, and, to a considerable extent, renewed the city.

In 1536 and 1537 Henry VIII. suppressed the monasteries. The minor establishments were the first to suffer; subsequently the priory of St. Swithin, Hyde Abbey, which had been rebuilt, St. Mary's Abbey, and other establishments, were suppressed, and the structures pulled down or suffered to go to ruin. The last of the great sufferings of Winchester were during the civil war between Charles I. and the parliament. The city adhered to the king. After the battle of Naseby Cromwell was sent to reduce it under the authority of the parliament. After a week's siege he performed his task, and he then blew up Winchester Castle, and laid Wolvesey Castle and the other fortified places in ruins. Charles II. employed Sir Christopher Wren to design and erect a palace on the site of Winchester Castle. The work was commenced in 1683, and was carried on till the death of Charles, in 1685, when a stop was put to it, and it has never been completed. It has since been converted into barracks.

The city is built on the west bank of the river Itchin, on the slope of an eminence which rises gently to the west. The river is made navigable as a canal from Winchester to the sea. The principal street, called the High Street, runs E.S.E. to W.N.W. through the middle of the city, and is about half a mile long. Nearly all the other streets are at right angles to the High Street. Most of the houses are good, though many are old, and the streets are well paved, and are lighted with gas. The city formerly had four principal gates, of

which only the West Gate now remains; it is a massy square tower over a gateway.

The town has no trade of consequence, but the statements of population show that it is in a state of gradual improvement. Being the centre of an agricultural district, it has a good corn-market, which is well attended.

Winchester Cathedral, which is one of the largest cathedrals in England, is in many respects one of the most interesting. The entire length is 545 feet. The nave is 250 feet long, 86 feet wide including the aisles, and 78 feet high. The length of the transept is 186 feet. The height of the tower is 138½ feet, which is only about 26 feet above the roof.

Winchester College (St. Mary's College) was founded by William of Wykeham, in 1387, on the site of the grammer-school at Winchester, at which he had been educated. The college was founded and endowed by Wykeham as a preparatory college to New College, Oxford, which he had founded a short time before. [NEW COLLEGE.]

The ruins of Wolvesey Castle, once the residence of the bishops of Winchester, are at a short distance south-east from the college. The present plain but neat episcopal residence was formed out of the west wing of the former episcopal palace. The Cross, in the High Street, is supposed to have been erected about the beginning of the 15th century. Winchester Castle, on an eminence outside the city wall on the S.W., has already been noticed. The chapel of Winchester Castle, which was a building detached from the Castle, and at a short distance, was not destroyed, and has since been converted into a court for holding the assizes. There are still 9 churches in Winchester, most of which are ancient. The other public buildings are the Guildhall, the Market-House, the County Gaol, the City Bridewell, the County Hospital, the Central Schools, St. John's House, which is the public banqueting-room and assembly-room, a small theatre, and a public library and reading-rooms.

The Hospital of St. Cross, about one mile S. from Winchester, was founded and endowed in 1136, by Henry de Blois, bishop of Winchester. The church is very beautiful. The greater part of the buildings which remain were erected during the prelacy of Cardinal Beaufort.

The municipal borough is divided into 3 wards, and governed by 6 aldermen (one of whom is mayor), and 18 councillors: population, 10,732. The parliamentary borough returns 2 members: population, 9730.

WINCKELMANN, JOHANN JOACHIM, was born at Stendal, in Prussia, in 1717. His parents were extremely poor, but he was sent to the free-school of his native place, where he soon attracted the notice of the rector Tappert, who took him into his house as a companion, and when the old man became blind Winckelmann read to him and led him.

In 1735 Winckelmann went to Berlin and studied for a year at the Köllnische Gymnasium. In 1738 he entered the university of Halle, where he studied two years. From 1741 to 1748 he obtained a subsistence by teaching, and pursued his own studies in his leisure hours. In the latt year he was appointed secretary of the library Count Von Bünau at Nöthenitz, near Dresde His vicinity to Dresden induced him often to p form the journey from Nöthenitz to the gre gallery in that city, where he became acquaint with artists, and he endeavoured to become o himself; but he found that it was too late apply himself practically to any of the arts, a he resolved therefore to devote himself to th history and theory. In 1754 he embraced t Roman Catholic religion, and gave up his situati with Count Bünau; after which he lodged wi an artist in Dresden, prosecuted his new studi with ardour, and produced his first work, entitl 'Reflections upon the Imitation of the Antiqu in 1755. Of this treatise only fifty copies we printed. At the end of 1755 Winckelmann l Dresden for Rome, with a pension of 200 ri dollars (45*l.*) granted him by the Elector Saxony for two years.

He took letters with him to Mengs and to t Pope's physician Laurenti, through whose intere he was presented to the Pope, Benedict IV., a found easy access to all the literati and virtuosi Rome. In 1756 he published a new edition his treatise upon the imitation of the antique, wi two other treatises. In 1758 Winckelmann ma a journey to Naples to examine the interesti remains of Herculaneum, Pompeii, and Pæstu He went also in the same year to Florence, make a catalogue of the cabinet of cameos, &c., Baron Stosch, which detained him nine mont ('Description des Pierres gravées du feu Bar de Stosch'). On his return to Rome, Cardin Albani gave him the place of his librarian a keeper of his gallery of antiquities, with apa ments free, and a monthly salary of ten scu This situation, with his salary from Dresde which was still continued, enabled him to live comfort.

In 1762 his 'Remarks upon the Architectu of the Ancients' ('Anmerkungen über die Ba kunst der Alten') was printed in Germany. 1763 he received the appointment of Antiquar della Camera Apostolica, with a salary of abo fifteen scudi per month; he had also from Cardin Albani, who in 1761 became librarian of t Vatican, a retaining salary of fifty scudi per a num, for the first vacancy in the Vatican libra In 1764 appeared at length, at Dresden, h 'History of Ancient Art' ('Geschichte der Kun des Alterthums'). About the same period a peared his 'Sendschreiben über die Hercula ischen Alterthümer,' and 'Nachrichten von d neuesten Herculanischen Entdeckungen.' He no became known throughout Europe, and w elected a member of several foreign scientific a literary societies. In 1766 appeared his 'Mon menti Antichi Inediti,' with 227 plates; in 176 'Anmerkungen zur Geschichte der Kunst,' as sort of supplement to his History.

In 1768 he revisited Germany, and went Munich and Ratisbon, whence he passed Vienna and Trieste, on his return to Rom While waiting at Trieste for a vessel, he w stabbed in his room at the inn by an Italia

named Arcangeli, with whom he had been travelling, and who meant to rob him. The murderer was alarmed by a child knocking at the door, and fled without his booty, but was caught and executed. Winckelmann died seven hours after he had received the wounds, June 8, 1768.

WIND, a motion of the atmosphere independent of that which it has in consequence of the diurnal and annual movements of the earth, which being performed in a portion of space devoid of any resisting medium, the atmosphere is not disturbed by those movements. Thus the angular velocity of the air on any parallel of terrestrial latitude being the same as that of an observer on the same parallel, the air would seem to be at rest about him. But if, from any disturbance of the equilibrium of the atmosphere, the particles should move less rapidly than the observer from west to east, or should acquire movements in some other direction, then the sensation of a wind would be experienced.

The phenomena and causes of the great currents of the atmosphere are noticed under MONSOONS; TRADE WINDS; WHIRLWINDS. The only winds of a regular character which remain to be noticed are the Land and Sea Breezes which occur diurnally on the coasts and in the islands of the tropical regions, and the periodical winds which are observed to prevail in some parts of Europe. The first are most probably caused by the inequality of the sun's action on the land and water; and both, by the tendency of the atmosphere to preserve a state of nearly uniform density. During the day the land acquires a temperature higher than that of the neighbouring ocean: the atmosphere above it consequently becomes rarefied, and from about 9 A.M. the air from the sea flows towards the land, to occupy the partial vacuum there produced. In proportion as the heat of the land goes on increasing, the force of the sea-breeze also increases, and this continues till 2 or 3 P.M. After that time the temperature over the land diminishes more rapidly than over the sea, as the heat more readily disengages itself from the land than from the water, and about sunset the breeze from the sea ceases. During the night, the land continuing to cool, the air over the sea becomes comparatively warmer and more rarefied, and a breeze from the land takes place: this wind augments in force till near sunrise, when the temperature of the earth begins to increase, and about 9 A.M. the wind blows from the sea as at first.

The Etesian Winds (so called from ἐτησίαι, *annual*) is a designation formerly given only to those which every summer blow during six weeks over the countries bordering the Mediterranean, but it has since been applied to other periodical winds, as those which blow on the coast of Holland. They commence in the Levant about the middle of July, rising at 9 A.M., and continuing during the day-time only: the direction of the current of air is from north-east to south-west; and it is probably caused by the rarefaction of the atmosphere nearly under the tropic of Cancer, in consequence of the heat of the sun at that season.

WIND MEASURER. [ANEMOMETER.]

WINDAGE is the quantity by which the diameter of the bore of a gun, mortar, or howitzer, exceeds that of the shot or shell which is to be discharged from it. The windage of guns in the British service formerly amounted to as much as one-twentieth of the diameter of the bore; and, in consequence, much of the fired gunpowder escaped without producing any impulse on the shot, and the latter was driven from one part of the surface of the bore to another; so that, on being expelled from the gun, it deviated widely from the intended direction of its flight.

The correct geometrical forms which are now given to the balls, and also to the bores, permit the windage to be reduced much below its former value. The following table shows that which is now allowed in this country for the shot appertaining to some of the heavier kinds of ordnance:—

	inch.
For 10-inch and 13-inch mortars	0.16
8-inch iron guns	0.125
32-pounder do. (diam. of bore = 6.35 in.) .	0.173
24-pounder do. (diam. of bore = 5.75 in.) .	0.138
18-pounder do. (diam. of bore = 5.29 in.) .	0. 93
9-pounder do. (diam. of bore = 4.2 in.) .	0.1

WINDAU. [COURLAND.]

WINDERMERE. [LANCASHIRE; WESTMORLAND.]

WINDLASS is a general name for any machine consisting of a barrel, of a cylindrical or conical form, which turns between two points of support on a pivot at each extremity of its axis, or upon a pivot at one extremity only. The machine, by means of a rope or chain passing round the barrel, raises heavy burthens, or draws them towards itself. Thus the *Winch and Axle*, the *Windlass* by which on board of small ships the anchors are weighed, and even the *Capstan*, are so many different forms of the same machine.

In the last two of these machines the power of men is applied at the extremities of handspokes or levers inserted at their opposite extremities in holes made in the axle or barrel to receive them. In the capstan, the axis of the barrel being vertical, the handspokes are in horizontal positions, and the men exert a continuous pressure against them while walking round.

In the machine to which the name of windlass is more particularly applied, the barrel is a horizontal cylinder. In order to turn the cylinder on its axis, the men mounting on it plant their handspokes vertically in a series of holes formed at intervals for the purpose; then grasping them as high as they can reach, they pull towards themselves: when the cylinder is turned nearly a quarter round, the handspokes being almost in horizontal positions, the men throw upon them the whole weight of their bodies, and by the weight the cylinder is still further turned. After this the handspokes are drawn out and planted in other holes, which now are in vertical positions, and the like exertions of muscular force and pressure are repeated till the anchor is weighed or the weight raised. The machine permits the power of men to be applied, in one position of the handspokes, in the most advantageous manner; and in this respect it may be considered superior to the capstan.

The vertical windlass, or capstan, was originally a short cylindrical column turning on its axis by means of levers or bars of considerable length which passed quite through the perforations made to receive them at the top of the column; the pivot or axle upon which it turned, entered, as at present, into the floor or deck upon which the machine was placed. It appears to have been introduced into the British navy in the time of Queen Elizabeth. It is now generally made in the form of a frustum of a cone, or rather the body is cylindrical, and about it, at equal intervals, are ribs or buttresses which, projecting from the cylinder less at top than at bottom, give to the part about which the rope turns a pyramidal figure. Both the windlass and the capstan are furnished with catches, or *Paulls*, each consisting of an arm of metal turning on a pivot, and as the barrel revolves falling into notches formed in a ring of wood or metal placed round one end of the barrel.

WINDMILL is a building containing machinery for grinding corn, pumping water, sawing wood, or for any purpose depending on wheelwork, to which motion is communicated by the impulse of the wind. Windmills are of two kinds: in one the wind is made to act upon vanes or sails, generally four, which are disposed so as to revolve by that action in a plane which is nearly vertical; and in the other, the axis of revolution being precisely vertical, any point on the surface of a vane revolves in a horizontal plane. The former is called a Vertical Windmill and the latter a Horizontal Windmill.

The building for a Vertical Windmill is generally a wall of timber or brickwork in the form of a frustum of a cone, and terminated above by a wooden dome which is capable of revolving horizontally upon it. A ring of wood, forming the lower part of the dome, rests upon a ring of the same material at the top of the wall, and the surfaces in contact being made very smooth, the dome may easily be turned round upon the wall; and is prevented from sliding off by a rim which projects from it, and descends over the interior circumference of the lower ring.

The dome in turning carries with it the windsails and their axle; and thus the windsails may be made to coincide with the direction of the wind, or the plane in which the radii of the sails turn may be made perpendicular to that direction. The revolution is sometimes accomplished by the force of a man applied to a winch near the ground; but in general the wind itself is made to turn the dome of the mill by means of a set of small vanes which are situated at the extremity of a long horizontal arm projecting from the dome in a plane passing through the vertical shaft of the mill, and on the side opposite to the great sails.

A Horizontal Windmill is a great cylindrical frame of timber, which is made to revolve about a vertical axis, and its convex surface is formed of boards attached in vertical positions to the upper and lower parts of the frame. The whole is inclosed in a fixed cylinder having the same vertical axis as the other: this consists of a screen formed by a number of boards which are disposed so that, in whatever direction the wind may blow, it ma enter between them on one side only of a vertic plane passing through the axis, and thus give m tion to the interior cylinder. The effective pow of the Vertical Windmill is however so muc greater than that of the Horizontal Windmill th the latter is now seldom constructed.

WINDSOR, formerly called *New Windsor*, municipal borough and parliamentary borough, Berkshire, is 21 miles W. by S. from London b the Great Western Railway. There is also branch to it from the South-Western Railwa It derives its importance, and perhaps its origi from having been a favourite residence of many the kings of England since the Conquest. T Saxon kings had a palace at Old Windsor, a Edward the Confessor occasionally kept his cou there; but it is a distinct parish, about 2 mil S.E. from New Windsor. In the reigns of Willia the Conqueror and William Rufus, Windsor Cast was a military fortress. Henry I. rebuilt t castle, and held his court there, and from th time it became the frequent residence of the kin of England.

Windsor is situated on rising ground on t S.E. or right bank of the Thames, and consis of six principal streets, well paved, and light with gas, besides a number of smaller stree Eton on the opposite bank of the Thames, for in appearance one town with Windsor, t line of houses being interrupted only by t bridge, a neat structure of iron 200 feet long a 26 feet wide, and consisting of three arches. T public buildings of Windsor (exclusive of tho pertaining to the castle) are not in any way markable. The Lower Castle Ward is divid into two parts by St. George's Chapel, whi stands in the centre. It was begun by Edwa IV. (1461–83), and was not completed until af the commencement of the 16th century. It is o of the most beautiful specimens of ornamen pointed architecture in this country. The ce taph of the Princess Charlotte is in St. Georg Chapel. Edward IV., Henry VI., Henry VII and Charles I., were buried here. At the foot the altar is a subterranean passage communicati with the tomb-house in which George III., Geo IV., William IV., and others of the present ro family were interred. St. George's Chapel i collegiate establishment. The parish church w completed in 1822, in the later pointed sty There are places of worship for several deno nations of dissenters. The town-hall was erec in 1686. A free-school, erected in 1706, is par supported by endowments. There is a theat royal, and there are three or four charitable in tutions.

The municipal borough is divided into 2 war and governed by 6 aldermen (of whom one mayor) and 18 councillors: the population 1841 was 7786. The parliamentary borough turns 2 members: population, 9062.

The castle is surrounded on two sides by Little Park, which comprises about 13 acres. the reign of Queen Anne that part of Wind Forest which remained the property of the cro under the name of the Great Park, was cut off fr

the castle by the intervening private property; and it was therefore determined to buy as much land as might be required to complete an avenue from the castle to the forest. This is the present Long Walk, which is a perfectly straight line, above 3 miles in length, running from the principal entrance to the castle to the top of a commanding hill in the Great Park, called Snow Hill. On each side of the road, which has a gentle rise, there is a double row of stately elms, now in their maturity. In 1832 a colossal equestrian statue of George III. was erected at the top of the Great Walk. At the southern extremity of the Great Park is Virginia Water, the largest artificial lake in the kingdom.

Windsor Castle, after having been rebuilt by Henry I., was enlarged by Henry III., but it was not till the 14th century that the plan of the whole began to assume its present extent and arrangement, when Edward III. first erected the buildings forming the Upper Ward, east of the Keep. The same king founded the College or Free Chapel of St. George, in the Lower Ward. These works were carried on from about 1350 to 1374, and were chiefly conducted by William of Wykeham. From this period comparatively little was done until a century afterwards, when Edward IV. began to re-erect St. George's Chapel, within the precincts of the castle. Henry VII. made some additions to the castle, and Queen Elizabeth caused the terraces to be formed, thereby giving to the royal abode of Windsor what is not the least striking or least attractive of its characteristics. Under the Stuarts nothing material was done until the Restoration, when the castle began to be modernised in a tasteless manner. The principal addition made by Charles II. was the Star-Building, containing the state apartments. George III. restored the interior of St. George's Chapel (1787–90), which was done in a very judicious manner, by scrupulously following the original details. In 1796 James Wyatt was first employed at Windsor, and gothicised the Star-Building and the corresponding portion on the north side of the inner quadrangle as far as St. George's Hall.

George IV. having announced his intention of taking up his abode within the castle, and converting it into a suitable residence for himself and his successors, a grant of 300,000*l.* was voted by parliament, in April, 1824, for the projected improvements, and four architects were called upon to furnish designs for the intended works—Soane, Nash, Smirke, and Jeffry Wyatt. Wyatt's plans were approved of, and no time was lost in carrying them into execution, the first stone of King George IV.'s Gateway having been laid by the king himself, August 12, 1824; on which occasion the architect received the royal authority for altering his name to that of Wyatville; and on the king's taking possession of the private apartments, which were completed by the end of 1828, he received the further distinction of knighthood. [WYATVILLE.] After the first grant of 300,000*l.*, others were successively made, and the total expenditure down to the end of the reign of William IV. amounted to 771,000*l.* There has since been a grant of 70,000*l.* for new stables, which form an extensive range of buildings, south of the castle.

WINE. Wine is the result of the fermentation, more or less complete, of certain saccharine fluids, either existing naturally in the juices of plants, or artificially blended together. The natural juices susceptible of fermentation are found either in the roots of plants, such as the parsnip and beet-root; extracted from the stem, as in the birch and cocoa-palm; expressed from the leaves, as in the grape-vine; obtained from the spatha, as of the *Sagus vinifera*, the *Phœnix dactylifera*, and other palms; and in the mature or immature fruits of many well-known plants, such as gooseberries, currants, and, above all, the grape, to the fermented juice of which the term wine is always understood to be applied when used absolutely. The species of grape which yields the most esteemed wine is the *Vitis vinifera*. [VITIS.]

WINES and SPIRITS. The duty at present on all foreign wines is 5*s.* 6*d.* per gallon; on Cape wines, 2*s.* 9*d.* The following statement shows the number of gallons imported into the United Kingdom during the year ending Jan. 5, 1850, together with the number retained for home consumption, after deducting the quantity exported subsequently to the payment of duty.

Wines.	Imported.	Retained.
	Gallons.	*Gallons.*
Cape	264,106	241,845
French	466,169	331,690
Portugal	3,004,043	2,648,242
Spanish	3,310,206	2,448,107
Madeira	165,463	71,097
Rhenish	63,380	46,405
Canary	151,239	19,868
Fayal	12,163	67
Sicilian and other sorts	533,298	444,541
Total	7,970,067	6,251,862

The duty at present on foreign spirits is 15*s.* per gallon; on colonial spirits, 8*s.* 2*d.* per gallon for England, 4*s.* per gallon for Scotland, and 3*s.* per gallon for Ireland. On British spirits distilled in England the duty is 7*s.* 10*d.* per gallon, in Scotland 3*s.* 8*d.* per gallon, and in Ireland 2*s.* 8*d.* per gallon: all estimated at proof.

Foreign Spirits. In the year ending Jan. 5, 1850, the quantity of brandy imported into the United Kingdom was 4,479,549 gallons; of Geneva, 471,232 gallons. The quantity of brandy retained for home consumption was 2,187,358 gallons.

Colonial Spirits. In the year ending Jan. 5, 1850, the quantity of rum imported from the British possessions in the West Indies and Mauritius was 4,426,651 gallons; from the East Indies, 696,497 gallons. The quantity of rum retained for home consumption was 2,920,347 gallons.

British Spirits. In the year ending Jan. 5, 1850, the quantity of proof spirits distilled in England was 5,573,411 gallons; in Scotland, 10,846,634 gallons; in Ireland, 8,355,083 gallons. Of these quantities, in England the whole was made from malt with unmalted grain, molasses, sugar, &c., and none from malt only; in Scotland,

the quantity made from malt only was 6,058,086 gallons, the rest (4,788,548 gallons) being made from malt with unmalted grain; in Ireland 85,756 gallons were made from malt only, 8,047,077 gallons from malt with unmalted grain, and 222,250 from molasses, sugar, and unmalted grain.

In the year ending Jan. 5, 1850, the quantity of proof spirits imported into England from Scotland was 2,651,529 gallons; from Ireland, 890,021 gallons. The duty charged on both was 7*s.* 10*d.* per gallon. The total amount of duty on the spirits imported into England from Scotland, was 1,038,515*l.* 10*s.* 6*d.*; from Ireland, 348,591*l.* 11*s.* 2*d.*

WING. [BIRDS.]

WING, VINCENT, an English astronomer of the seventeenth century, enjoyed some reputation during his life; and his astronomical writings, at the time they were published, possessed a certain value. Neither the year of his birth nor of his death is known. Wing was the author of a series of Ephemerides for thirteen years, viz. from 1659 to 1671 inclusive; and he published annually for the Stationers' Company a book almanac and a sheet almanac, the latter of which is still continued under his name.

WINGATE, EDMUND, a younger son of Roger Wingate, a landed proprietor, was born in Yorkshire in 1593, entered of Queen's College, Oxford, in 1610, whence, after his degree, he removed to Gray's Inn. Here he mixed mathematical studies with his legal ones, and became well known in the former sciences. In 1624 he removed to France, where he spent some years, and seems to have been about the court: he taught English to the Princess Henrietta Maria and her ladies. By the time the troubles broke out he had inherited some property in Bedfordshire; he took the Covenant, was justice of the peace, recorder of Bedford, and held other offices. In 1650, or thereabouts, he took the oath called the Engagement, became known to the Protector, and served in parliament for the county of Bedford. He was buried at St. Andrew's in Holborn, London, Dec. 13, 1656. The work by which Wingate is best known is his 'Arithmetic,' of which the first edition was published in 1630.

WINSCHOTEN. [GRONINGEN.]

WINSLOW. [BUCKINGHAMSHIRE.]

WINSTER. [DERBYSHIRE.]

WINTER, SPRING, SUMMER, AUTUMN. According to the best authorities, and in astronomical terms, it is spring from the middle of March to the middle of June, summer from thence to the middle of September, autumn from thence to the middle of December, and winter from thence to the middle of March again. At the same time the poets and the farmers, who have a much better right than the astronomers to settle the meaning of these terms for common use, agree in placing the rise of vegetation, the pairing of birds, and the first appearance of flowers, in the spring; the hay harvest and the ripening of all the earlier fruits, in summer; the grain harvest, the later fruits, and the fall of the leaves, in autumn; and the heavier frosts, snow, and ice, in winter.

It is impossible to fix a common commencement of the seasons even for the parts of the earth which lie between the Arctic circle and the tropic, which are all that need be considered; for the polar and intertropical regions have each a set of seasons of their own. But this we may safely say, that the agricultural and poetical seasons are earlier than the astronomical ones. All that distinguishes spring from winter begins to take place before the vernal equinox, all that distinguishes summer from spring before the summer solstice, and so on. Most certainly it will be found that the greatest intensity of the several seasons happens, one year with another, at a period not long after the astronomical phenomenon at which the season is said to commence.

When the year is divided only into summer and winter without further subdivision, it is then an exact division to say that the two halves begin and end with the equinoxes. But here the principal phenomena, the solstices, on approach to which heat and cold depend, are in the middle of the halves. If we were to divide the year into four seasons during which the earth should receive from the sun the greatest and least portion of heat in two of them, and intermediate portions in other two, the four astronomical commencements should be made the middle points of these seasons.

WINTERA'CEÆ, a natural order of plants belonging to the albuminous group of polypetalous Exogens. It contains four genera, *Illicium*, *Temus*, *Drymis*, and *Tasmania*.

The following are the principal species of the genera:—*Illicium Floridanum*, the Florid Anise-Seed Tree. *Illicium anisatum*, the Chinese Anise-Seed Tree. *Temus moschata*, a shrub found in Chili. *Drimys Winteri*, Winter's Bark, a tree, native of the Straits of Magalhaens. The bark, which is met with in English commerce is in quills about 1 foot in length and from 1 to 2 inches in diameter. It is an excellent aromatic, but can seldom be met with in druggists' shops. *Drimys Granatensis*, New Granada Winter's-Bark, a tree about 20 feet high, grows on the mountains of New Granada and Brazil. *Tasmannia aromatica* is a native of Australia and Van Diemen's Land.

WIRE is metal elongated into the form of a slender rod, generally cylindrical, but not necessarily so. In early times, metals were probably beaten out with a hammer into thin plates or leaves, which were then divided into small slips by means of scissors or some other cutting instrument, these slips being subsequently rounded by a hammer and file, so as to form threads or wire. So long as wire was formed by the hammer, the artists of Nürnberg, by whom it was fabricated, were styled 'wire smiths,' but subsequent to the introduction of the drawing process their designation was changed to 'wire-drawers.' Beckmann conceives that the invention of wire-drawing may be assigned to the 14th century. Previous to 1565 all English iron wire appears to have been drawn by manual strength. The first wire-mill in England was set up at Sheen, now Richmond, by a Dutchman, in 1662.

For the manufacture of iron wire the very best and toughest iron is selected. Before the proc-

of rolling with grooved rollers had become common, the iron was prepared for use by a slow and tedious process. At the present day the preparing of iron for the wire-drawers is performed by means of rollers, which are generally 7 or 8 inches in diameter, and are sometimes made to perform 350 revolutions in a minute. A bar of steel 30 inches long and an inch square, heated to redness, is passed between the rollers, through grooves successively diminishing in size, eight times in less than a minute, and is thereby elongated to from 20 to 30 feet. For ordinary wire the rods are commonly reduced to a thickness of about one-eighth of an inch by this process; and these rods themselves are used as wire for some purposes. The kind of cast-steel wire of which the best needles and some other articles are made, is not usually submitted to the rolling process, but, after being tilted to about a quarter of an inch square, it is rounded on an anvil previous to elongation by the draw-plate.

The drawing of wire is thus managed. The draw-plate is usually formed of a stout piece of shear-steel, about six inches long and an inch and a half in diameter, but being somewhat reduced in thickness towards each end, like a cucumber, and flattened on one side. It is pierced transversely with several conical holes, the larger orifices of which open upon the flattened surface of the plate, while their smaller orifices are carefully finished to the size to which it is intended to reduce the wire drawn through them. In drawing wire by hand the draw-plate is laid against two upright pillars fixed on a bench or table, and, the extreme end of the wire to be drawn being so reduced as to enable it readily to pass through the hole, a small portion is drawn through by a lever apparatus, and attached to a cylindrical drum, mounted on a vertical axis. The workman then takes in one hand the coil of thick wire to be reduced, and in the other a lever handle attached to the drum; and while he turns the drum so as to wind the wire upon its circumference, and consequently to draw it through the plate, he imparts a kind of twist to the wire which enters the plate, by a peculiar motion of the hand in which the coil is supported.

The size of wire is commonly measured by means of a gauge which consists of a plate of steel with a series of deep notches or slits at each edge, varying slightly from each other in width, and numbered according to the number given to wire of corresponding size.

WIRE-WORM. [ELATERIDÆ.]

WIRKSWORTH. [DERBYSHIRE.]

WIRTEMBERG. [WÜRTEMBERG.]

WISBECH. [CAMBRIDGESHIRE.]

WISCONSIN, one of the United States of North America, is situated between 42° 30′ and 49° N. lat. and between 86° 40′ and 95° W. long. It is bounded S. by Illinois, E. by Lake Michigan, W. by the Mississippi, and N. by Upper Canada, the boundary line running through Lake Superior, and extending N.W. to the Lake of the Woods. The area is about 90,000 square miles. The population in 1840 was 30,945; in 1847 it was 220,867.

By far the largest part of Wisconsin, extending N.W. from the river Wisconsin to the headwaters of the Mississippi and the Lake of the Woods, has not been surveyed, and is very imperfectly known. The sources of the Mississippi are in an elevated table-land, which abounds with lakes and swamps. North of the river Wisconsin is an extensive range of mountains named the Wisconsin Mountains, which attain a general elevation of 2000 feet above the sea. The forests on these mountains consist chiefly of yellow pine, pitch pine, and white pine; white birch, white cedar, spruce, and juniper, are also common.

The best-known portion of Wisconsin is that which lies S. of Green Bay, which is near the N. end of Lake Michigan, S. of the Fox River, which falls into Green Bay, and S. of the river Wisconsin, extending to the state of Illinois. The country along the shores of Lake Michigan is an extensive flat embracing woodlands and prairies alternating with each other. The lands along the Fox River, and towards Winnebago Lake, have a considerable degree of fertility. The country between Illinois and the Wisconsin, where that river runs from E. to W., is an irregular plain, elevated from 250 to 300 feet above the surface of the Mississippi, and consists of limestone, which is often rent by chasms of considerable depth but little width. On the upper surface of the plain are numerous single hills rising from 200 to 600 feet above their bases, and from 600 to 1000 feet above the watercourses which run in the chasms. The greater part of this region is a prairie destitute of wood, and generally covered with a good turf. There are also many tracts overgrown with trees, especially stunted oak, but these woods have no underwood, and the single trees are generally from 10 to 20 feet from one another. In a few places the forests are more dense. The limestone rocks rarely appear on the surface except in the chasms, being usually covered with a black mould which has frequently a depth of from 4 to 5 feet, and seems to be a fertile soil; but no part of it has been cultivated, agriculture being at present limited to the bottoms of the rivers, which run at a considerable depth below the general level of the country.

The chief river is the Wisconsin, which flows through the southern part of the State, and falls into the Mississippi. [MISSISSIPPI, viii., 611.] The river next to the Wisconsin in importance is the Fox River, which runs N. to a series of lakes extending from west to east. Issuing from these lakes the Fox River runs N.W. till it is joined from the N. by the largest of its affluents, the Wolf River. The united river passes through a small lake into Winnebago Lake, which is 30 miles long and nearly 10 miles across in the widest part. It leaves this lake at its north-western extremity, and soon afterwards forms some rapids, which obstruct navigation, but do not interrupt it. The remainder of its course lies to the N.E., and it falls into the most southern recess of Green Bay. The Rock River rises in Wisconsin. [MISSISSIPPI, viii. 611.) The other rivers are of less importance.

The winters in Wisconsin are very cold and

the summers very hot. The difference between the two seasons is much greater than in the northern countries of Europe which are under the same degree of latitude and nearly as elevated. During the winter the thermometer frequently descends below zero of Fahrenheit, while in the month of March the temperature rises much more rapidly than in any part of Europe.

Winconsin is chiefly agricultural. In 1840 there were produced 212,116 bushels of wheat, 11,062 of barley, 406,514 of oats, 10,654 of buckwheat, 379,359 of Indian corn, 419,608 of potatoes, and 6777 lbs. of wool.

The S.W. part of Wisconsin is very rich in minerals. Lead ore yielding 75 per cent. of metal is abundant, and is extensively wrought; and copper-ore is found, and worked to some extent.

Madison, the seat of government, 90 miles W. from Milwaukie, is situated on a peninsula between two of a chain of lakes called The Four Lakes. It contains a spacious state-house, and had in 1840 a population of 376. *Milwaukie*, the largest town in the State, is situated on both sides of the river Milwaukie, near its entrance into Lake Michigan. The river affords water-power capable of driving 200 run of mill-stones. It contains a court-house, gaol, land-office, and 8 places of worship. The population in 1840 was 1712; in 1845 it had risen to 7500.

Wisconsin was discovered by the French from Canada towards the end of the 17th century. It was constituted a Territory in 1836, and a State in 1848. The legislature consists of 18 senators, who are elected for 2 years, and 54 representatives, who are elected for one year. The governor is elected for 2 years. Wisconsin sends 2 senators and 3 representatives to Congress.

WISDOM, BOOKS OF. [Ecclesiasticus; Solomon.]

WISE, MICHAEL, a composer of church music, was born in Wiltshire. He was appointed organist in Salisbury Cathedral in 1668; in 1675, Gentleman of the Chapel-Royal; and in 1686, almoner of St. Paul's Cathedral, including the mastership of the choristers. He was killed in an affray with a watchman. His anthems, 'Awake up, my Glory,' 'Prepare ye the Way of the Lord,' and 'The Ways of Zion do mourn,' are still listened to with admiration.

WISMAR. [Mecklenburg.]

WISTA'RIA, a genus of plants belonging to the natural order *Leguminosæ*. The species are deciduous twining shrubs, natives of North America and China. They grow vigorously in Great Britain, and form when in flower the handsomest ornaments of our gardens. *W. frutescens*, Shrubby Wistaria, is a native of Virginia and the Carolinas, in boggy places. It is an elegant climbing plant. *W. Chinensis*, Chinese Wistaria, is a deciduous climber, which on account of its rapid growth and hardy habits, is getting very common in England, and will probably soon be as great a favourite as the laburnum. This species was originally called *Glycine Chinensis*, a name which in some places it still retains.

WISTON. [Pembrokeshire.]

WITCH-HAZEL. [Wych-Hazel.]

WITENAGEMOTE, literally an 'assembly wise men,' from the Anglo-Saxon 'gemoth,' 'assembly,' and 'witan,' 'to know,' which h the same root, 'wit' or 'wis,' as the word w witness, wise, and the legal phrase still in use ' wit.' The nature of this assembly and its powe cannot be stated with any precision except some length. The materials for forming opinion of the constitution and functions of th council, which existed under the Saxon kings England, may be found in Turner's 'Histo of the Anglo-Saxons,' Sir F. Palgrave's 'Rise an Progress of the English Commonwealth,' an Kemble's 'Saxons in England.'

WITHAM. [Essex.]

WITHER, WYTHERS, GEORGE, was bo June 11, 1588, near Alton in Hampshire. Aft receiving the usual grammar-school instruction, was sent about 1604 to Magdalen College, Oxfor where, after remaining about three years, he w called home without having taken a degree. afterwards went to London, and entered himse at Lincoln's Inn. Some pieces of poetry h already made his name known, when in 1613 published his volume of poetical satires on t manners of the time, entitled 'Abuses Stript an Whipt.' For some things in this production was committed to the Marshalsea prison, and l there for several months. While in confineme he wrote and published his 'Satire to the King 1614, in which he complains of the injustice of h detention, and which is supposed to have procure his release. The spirit of his poetry and the usa he had met with now made him a great favouri with the puritanical party. When the great civ war began, Wither sold his estate, and raised troop of horse for the Parliament, in whose arm he was speedily promoted to the rank of majo He was taken prisoner by the royalists, but soo recovered his liberty. Not long after this he w made by the Long Parliament a justice of peac and afterwards by Cromwell major-general of a the horse and foot in the county of Surrey.

After the Restoration Wither was sent to New gate on the charge of being the author of a publ cation entitled 'Vox Vulgi,' which was regarde as a seditious libel. He obtained his liberty son years before his death, which took place May 1667. The list of his works, contributed to th 'British Bibliographer' by Mr. Thomas Par includes 112 articles. His poetry is of very u equal excellence, some of his lyrical pieces bei very elegant and lively, while some of the satiric pieces are of very little value.

WITHERING, WILLIAM, was born in 174 at Wellington in Shropshire, where his father w a surgeon-apothecary in considerable practice. H took his degree of Doctor of Medicine, at Edi burgh, in 1766, and commenced practice at Staffor where he married; but not succeeding, he remove to Birmingham in 1774. Here he quickly obtain a lucrative practice. He was much attached botany, and in 1776 published at Birmingham, i 2 vols. 8vo., 'A Botanical Arrangement of all th Vegetables naturally growing in Great Britain A second edition was published in 1793, and third in 1796. In this last edition the wor

was increased in size to four volumes, and a vast amount of original matter added. In 1785 he published 'An Account of the Foxglove and some of its Medical Uses.' He was the first physician who knew how to use Foxglove, and by his writings gave it character as a powerful medicinal agent. He died in November, 1799.

WITHERI'NGIA, an extensive genus of plants belonging to the natural order *Solanaceæ*. With the exception of a species which inhabits the Cape of Good Hope, they are all inhabitants of South America. About 20 species have been described.

WITNESS. [EVIDENCE.]

WITNEY. [OXFORDSHIRE.]

WITT, DE, CORNELIUS and JOHN, two Dutch statesmen. Their father was a leader in the party opposed to the House of Orange, and a member of the States General of Holland and West Friesland.

Cornelius de Witt was born at Dordrecht, June 23, 1623. He studied law, and afterwards served in the fleet of the United Provinces. On the overthrow of the Orange party in 1650 he was appointed burgomaster of his native town and elected deputy to the States of Holland and West Friesland. When his younger brother John assumed the government, he became a most efficient supporter of his policy for the following twenty years, and much of the history of Cornelius is included in that of John. In 1672 he was arrested on an accusation of conspiring to poison the Prince of Orange, conveyed to the Hague, put to the torture, and condemned to perpetual exile. After his condemnation John de Witt visited him in prison. A mob assembled, uttering violent threats against both brothers. The military were purposely sent out of the town, while the brothers, thus left without protection, were murdered, and their bodies hung on a gibbet.

John de Witt was born at Dordrecht in 1625, and educated at Leyden. The death of William II. of Orange (Oct. 2, 1650) threw the management of affairs into the hands of the party to which De Witt's father belonged. John de Witt was made pensionary of Dordrecht, and the ability which he displayed in that office procured for him in 1652 the more important appointment of Grand Pensionary of Holland, which he retained till 1672. During these twenty years he was in fact chief magistrate of the republic; and in the earlier part of that period he had to make head against Cromwell, during the latter against Louis XIV., and all the time against domestic faction.

De Witt on assuming the reins of government found the republic engaged in a war with England. After a series of sea-fights, a peace was signed at Westminster, April 15, 1654. In 1667 De Witt obtained the assent of the States General to the 'perpetual edict,' by which the office of stadtholder was declared to be abolished. [STADTHOLDER.]

De Witt continued to manage the affairs of Holland with prudence and sagacity, till the intrigues of his enemies prevailed, and the Prince of Orange was nominated captain and admiral-general, Feb. 25, 1672. In the course of two months the French and German armies had overrun a great part of the United Provinces, the advance-guard of the French army was within five leagues of Amsterdam, and the clamour for the rescinding of the perpetual edict was successfully renewed. The revocation was signed by the magistrates of the principal towns of Holland and West Friesland. Soon afterwards the enemies of De Witt caused his brother to be arrested. The melancholy fate of both the brothers has been already stated at the end of the notice of *Cornelius de Witt*.

WITTE, PIETER DE, or PIETRO CANDIDO, as the Italians called him, was born at Bruges in 1548. He went early with his parents to Florence, and studied as an historical painter there, in fresco and in oil. He assisted Vasari in Florence, and in his works in the Vatican at Rome. He also made for the duke of Tuscany many cartoons to be worked in tapestry. He was invited by the elector of Bavaria to go to Munich, which he did, and remained there until his death in 1628.

WITTELSBA CHIA, the name of a genus of plants belonging to the natural order *Ternströmiaceæ*. The two species referred to this genus are now placed in *Cochlospermum*. They are magnificent trees. They have lobed leaves with pointed petioles, and large yellow flowers arranged in panicles. *C. gossypium* is a native of the East Indies, where it attains a height of 50 feet. It is the *Bombax gossypium* of Linnæus. *C. insigne*, the *Wittelsbachia insignis* of Martius, is about 30 feet in height, and is a native of Minas Novas and Minas Geraes, in Brazil.

WITTENBERG. [MERSEBURG.]

WITTSTOCK. [BRANDENBURG.]

WIVELISCOMBE. [SOMERSETSHIRE.]

WOAD. [GENISTA.]

WOBURN. [BEDFORDSHIRE.]

WOKINGHAM. [BERKSHIRE.]

WOLCOTT, JOHN, better known by his assumed name of *Peter Pindar*, was born at Dodbrooke in Devonshire, in 1738. Soon after leaving school he was taken as an apprentice by his uncle, a medical practitioner at Fowey. He appears to have obtained a competent knowledge of his profession, though he had been at the same time cultivating his talents for versifying and painting.

In 1767 Wolcott, having procured the degree of M.D. from the university of Aberdeen, accompanied Sir William Trelawney to Jamaica, of which island the latter had been appointed governor. His hopes of obtaining a lucrative practice as a physician in Jamaica were soon dispelled; he therefore, in hope of preferment in the church, returned to England, was ordained, and then returned to Jamaica, but only obtained a small curacy. After the death of Sir William Trelawney, in 1768, Wolcott returned to England.

The next twelve years of his life were spent as a physician at Truro, Helstone, and other towns in Cornwall; but he had little success. In 1778 he published 'The Epistle to the Reviewers.' During Wolcott's residence at Truro he detected the talents of the self-taught artist Opie, whom he brought to London in 1780. Wolcott had now recourse to his pen for support. His 'Lyric Odes to the Royal Academicians for 1782, by Peter Pindar, Esq., a distant relation of the Poet of Thebes,

and Laureate to the Academy,' took the town by surprise. The justice of many of his remarks, the daring personalities, and the quaintness of the style, were something so new that the work was highly successful; thus encouraged, the author returned to the attack in 1783, 1785, and 1786. In order to keep alive the impression he had made, he assailed successively the king, ministers, opposition leaders, and authors. His popularity endured for nearly 40 years. A collected edition of his works was published in 1812.

After all his satires on George III. and Pitt, he accepted a pension from the administration of which Pitt was the head. He left a considerable property at his death, which took place in London, Jan. 14, 1819.

WOLF, *Canis Lupus*, Linn. Lieut.-Colonel Hamilton Smith makes *Lupus* the first section of his first subgenus, *Chaon*, of the *Diurnal Canidæ*, or Canine group furnished with a round pupil of the eye. In this section he comprises the common Wolf, *Lupus vulgaris;* the Black Wolf, *Lupus Lycaon;* the Dusky Wolf, *Lupus nubilus;* and the Wolf of the southern states of North America, *Lupus Mexicanus*, Smith. In the second section, *Lyciscus*, he places the North American Wolf, *Lyciscus latrans:* and the Caygotte of Mexico, *Lyciscus cagottus*, Smith.

The common Wolf of Europe (*Canis Lupus*), of which the Black Wolf (*Canis Lycaon*) is probably only a variety, is distributed throughout Europe generally, and a great part of Asia. In Africa the Wolf is represented by the Wild Hunting Dogs (*Lycaon*).

The common Wolf once abounded in our island, and continued to exist in Scotland and Ireland till within a very recent period. Everywhere the ravages of the wolf have obtained for it the enmity of man. Calves, sheep, goats, hogs, dogs, young colts, and even adult cattle, fall victims to its ferocity. In Russia, Norway, and Poland, this formidable animal occasions serious losses, nor is man himself secure. The same observations apply to the mountain districts of Spain, Portugal, France, and Italy, where the shepherds employ powerful dogs to defend the sheep.

WOLF, HIERO'NYMUS, was born Aug. 13, 1516, at Dettingen. He went to the university of Tübingen, and as his father could not supply him with money, he was obliged to become a sort of literary servant (famulus) to one of the professors. He was however soon tired of this situation, and went to Würzburg, where he got a place as clerk in the bishop's office. He soon left Würzburg for Wittenberg, where he attended the lectures of Melanchthon and others. Leaving Wittenberg, he stayed some time at Nürnberg, and then he went to Strassburg. The next few years he spent partly at Strassburg and partly at Basel, being engaged all the time in preparing his editions of Isocrates, Demosthenes, and Æschines. He finally settled at Augsburg, where Anton Fugger received him into his house, and employed him in his Latin correspondence. From 1551 to 1557 he was professor of Greek in the gymnasium of Augsburg, which with some other offices he held until his death in 1580.

Wolf was a very good Greek scholar. His editi of Demosthenes and Æschines, and his edition Isocrates, were very good for the time. He al edited Zonaras, and some other Greek writers.

WOLF, JOHANN CHRISTOPH, a learn Lutheran divine, was born on the 21st of Februar 1683, at Wernigerode, where his father was ecc siastical superintendent. In 1695 the fami removed to Hamburg, where the father died thr months after his arrival; but young Wolf found friend in Johann Albrecht Fabricius, who receiv him into his house, allowed him the use of h extensive library, and also gave him great assis ance in his studies. Having obtained a schola ship, which enabled him to continue his studi he went in 1703 to the university of Wittenber In 1707 he returned to Hamburg, where finally settled, on being appointed professor Oriental languages at the gymnasium; of whi he was afterwards appointed rector. He died Hamburg in July, 1739.

Wolf collected a very valuable library, which bequeathed to the city of Hamburg. Besides bei well versed in classical literature, he was a mo learned Hebrew and Rabbinical scholar. H principal work in this latter department is 'Bibliotheca Hebraica,' &c., to which a supplemen by H. F. Köcher, was published in 1783-4.

WOLF, FRIEDRICH AUGUST, was bo Feb. 15, 1759, at Hainrode, a village near Nor hausen. Under Hake, the head of the gymnasiu of Nordhausen, which Wolf entered in his 8th yea he conceived that love of antiquity which never fo sook him, and the same teacher also implanted him the habit of judging for himself without bei swayed by any authority, and of pursuing on one thing at a time. By following this syste and making good use of his time, Wolf, before went to the university, had read all the most i portant ancient, as well as German, French, En lish, Italian, and Spanish writers. In 1777 went to the university of Göttingen, where devoted himself to philology, but he was irregul in his attendance in the lecture-rooms. He valu private study more. He made up the deficienci in his finances by giving private lessons to oth students in Greek and English. Before leavi the university he presented to Heyne a dissert tion on Homer, in which he ventured to differ some points from Heyne; but Heyne refused read the essay. Wolf had previously incurr Heyne's displeasure by his irregular attendance his lectures.

In 1779 Wolf left Göttingen, and was imm diately appointed teacher in the pædagogium at feld. Here he published in 1782 his edition Plato's 'Symposium,' with notes. In 1783 he w invited to Halle to take the ordinary professorsh of philosophy in the university, and to be rector the pædagogical institute, which was then co nected with the university. His mode of teachi at Halle was so different from that which ha been usual, that in the first years he was litt appreciated by the students, and he found that must descend to the capacity and knowledge of h hearers. From the time that he adopted this pla his lecture-room was always crowded. With th

assistance of Baron von Zedlitz, the Prussian minister, Wolf transformed the pædagogical institute of Halle into a philological seminary, similar to that which Heyne conducted at Göttingen. Wolf was convinced that there is no fitter means of educating men for the higher purposes of life than the study of the ancient languages and antiquity generally; and his great object was to train a number of able teachers, who were to diffuse sound principles of education throughout Germany, and counteract the numerous empirical schemes which threatened to undermine all sound training. Wolf always regarded it as his peculiar vocation to work as a teacher; literary labours and reputation were matters of secondary importance with him. In 1789 he published his useful edition of the oration of Demosthenes against Leptines, with the declamation of Ælius Aristides on the same subject. In 1795 he published the results of his Homeric studies in his 'Prolegomena ad Homerum,' in which he endeavours to show that the 'Iliad' and the 'Odyssey,' in their present form, are not the work of Homer, but the works of several rhapsodists, which were put together and made up into the two epics, which now bear the name of Homer. This work created a great sensation among the learned in Europe; and though Wolf's conclusions may not be true, he set the example of a spirit of critical investigation which has had a great effect upon the learned of Germany and of the rest of Europe.

From 1804 to 1807 he was engaged in the publication of the text of the Homeric poems (Leipzig, 4 vols. 8vo.), of which an improved edition appeared in 1817. After the political disasters of 1806 the university of Halle was closed. In 1807 he went to Berlin, where he took an active part in the establishment of the university of Berlin. From 1807 to 1810 he edited, together with Buttmann, the 'Museum der Alterthumswissenschaft' (Berlin, 2 vols. 8vo.). In 1812 he edited three dialogues of Plato ('Euthyphro,' 'Apologia Socratis,' and 'Crito'), Berlin, 1 vol. 4to., with an elegant Latin translation. From 1817 to 1820 he edited a periodical, 'Literarische Analekten' (Berlin, 4 vols. 8vo.), perhaps the best philological journal that has ever been published. He gave it up suddenly in 1820, on account of the restrictions imposed upon the press by government. Some years after this he began to suffer from ill health. In April, 1824, he travelled to the south of France for the purpose of restoring his health. He died at Marseille on the the 18th of August, 1824.

WOLF'S BANE. [Aconitum.]

WOLFE, JAMES, son of Colonel Wolfe, was born at Westerham in Kent, on Jan. 15, 1726. A commission was obtained for him at an early age. In 1747 he distinguished himself at the battle of Lafeldt. During the seven years of peace which succeeded 1748 he gradually rose to the rank of lieutenant-colonel.

Hostilities re-commenced between France and Great Britain in 1755. In 1758 Wolfe was sent, with the rank of brigadier-general, on the expedition against Cape Breton. The brunt of the French fire in landing before Louisbourg was borne by the left division under Wolfe. Louisbourg surrendered on the 26th of July. [Cape Breton.] Wolfe soon afterwards returned to England.

In 1759 an expedition was fitted out against Quebec. The command of the sea-forces was intrusted to Saunders; the command of the land-forces (7000 men, including provincials) to Wolfe. Montcalm, the French governor, had concentrated all the forces he could raise in the province in Quebec, which he had fortified in a masterly manner. Wolfe, on the night between the 12th and 13th of September, landed his troops immediately above Quebec, and, favoured by the night, ascended the heights of Abraham, which command the city. Montcalm, when he learned that the English were in possession of these heights, saw at once that nothing but a battle could save the town, and took his measures accordingly. The battle was strenuously contested, but the French at length gave way. Montcalm and Wolfe both fell in the action. Five days afterwards Quebec surrendered, and Canada was lost to France.

James Wolfe was killed in his 34th year. His remains were brought to England, and interred at Greenwich. A monument was erected to him in Westminster Abbey, which was voted by the House of Commons in 1759.

WOLFE, REV. CHARLES, was born in Dublin, Dec. 14, 1791. The death of his father while Charles was still a child occasioned the removal of the family to England. He studied at Winchester College, and afterwards, in 1809, entered the university of Dublin, where he obtained a scholarship. He took his degree of B.A. in 1814, and holy orders in 1817. He officiated as a curate in Ireland, but became consumptive about 1821, and died Feb. 21, 1823. His literary compositions were collected and published in 1825 under the title of 'Remains of the late Rev. Charles Wolfe, A.B.' Wolfe is chiefly known as the author of the beautiful verses entitled 'The Burial of Sir John Moore,' which he composed in 1817.

WOLFENBÜTTEL. [Brunswick.]

WOLGAST. [Stralsund.]

WOLGEMUTH, MICHAEL, a celebrated old German painter and engraver on copper and in wood, was born at Nürnberg in 1434. He was the master of Albert Dürer. Wolgemuth's woodcuts are the oldest prints of that class in Germany, and they are extremely scarce. His paintings are likewise scarce; but a few specimens still exist at Nürnberg, at Vienna, the Louvre at Paris, and in the Pinakothek at Münich. He died in 1519, aged 85.

WOLLASTON, WILLIAM, was born in Staffordshire, March 26, 1659. He was entered in 1674 a pensioner at Sidney Sussex College, Cambridge, where he resided until Sept. 29, 1681, by which time he had taken his degree of M.A., and deacon's orders. On leaving college he became a teacher in Birmingham School, and took priest's orders. In August, 1688, Wollaston found himself in affluence by the death of a relation, and went to reside in London, where in 1689 he mar-

ried Miss Charlton, who brought him another accession of fortune. After this he devoted himself to the study of ancient languages, theology, mathematics, natural philosophy, and the Arabic language. The 'Religion of Nature Delineated,' the only work by which he is now known, was published in 1724. He died in London, Oct. 29, 1724.

WOLLASTON, WILLIAM HYDE, M.D., was born at Chiselhurst in Kent, Aug. 6, 1766. He studied at Caius College, Cambridge, where he took the degree of M.D. in 1793. In the same year he was elected a Fellow of the Royal Society, and in 1806 he was chosen one of its secretaries. Dr. Wollaston practised as a physician for some time at Bury St. Edmunds; he afterwards removed to London, relinquished his profession, and devoted himself to natural philosophy, which engaged his unremitting attention till his death, Dec. 22, 1828. The promulgation of the theory of definite proportions in this country is chiefly to be attributed to Dr. Wollaston, whose suggestion of a synoptical scale of chemical equivalents was brought before the Royal Society in November, 1813. Wollaston first demonstrated the identity of galvanism and electricity, and first explained the cause of their different phenomena. He made several other discoveries in chemistry, and many improvements in mineralogy and other branches of natural science.

WOLLASTONITE, or *Tabular Spar*, a rhombic, variously coloured, translucent crystal, consisting chiefly of silica and lime.

WOLLIN. [Stettin.]

WOLLSTONECRAFT, MARY. [Godwin, Mrs.]

WOLSEY, THOMAS, was born at Ipswich in Suffolk, in 1471. His parents were poor but reputable persons, and possessed of sufficient means to provide a good education for their son. He was sent to Magdalen College, Oxford, where he graduated at the age of fifteen. He was made fellow of his college, appointed teacher of a school in connection with it, and was ordained. At this school were three sons of the Marquis of Dorset, with whom Wolsey became acquainted, and through whose patronage he obtained his first ecclesiastical preferment, the living of Lymington, in Somersetshire. He was now 29 years of age, and possessed a winning address, great natural ability, and many acquirements. Sir John Nafant, treasurer of Calais, whose acquaintance he made in Somersetshire, named him his deputy, and by his influence at court procured for Wolsey a nomination as king's chaplain, and introduced him to Henry VII., in whose favour he soon gained a prominent place. Wolsey was sent on an embassy to Flanders relating to the marriage of the king, in which he gave the king great satisfaction; and it procured for him the deanery of Lincoln in 1508. In the following year the king died, and was succeeded by his son Henry VIII. Upon the young king's accession, Fox, bishop of Winchester, who held the offices of privy seal and secretary of state, made Wolsey the king's almoner. Before the year of the king's accession had passed, Wolsey had been made lord-almoner. In 1510 he became rector of Torrington; in 1511, canon of Windsor and registrar of the order of the Garter; in 1512 prebendary of York; in 1513, dean of York, and bishop of Tournay in France; in 1514, bishop of Lincoln, and in the same year archbishop of York. In 1515 he was made a cardinal, and succeeded Warham as chancellor. In 1516 the pope made him legate à latere. The enormous revenues that he derived from these and other sources were further increased by stipends received from the kings of France and Spain and the Doge of Venice. His ambition however was not satisfied. On the death of Leo X., in 1522, and again in the following year, on the death of Adrian VI., Wolsey sought the vacant papal throne, but in neither instance was he chosen. The see of Durham, to which he had been appointed in 1523, Wolsey resigned for that of Winchester.

Nobody could vie with Wolsey in display: his retinue on the Field of the Cloth of Gold, at the interview between Henry VIII. and Francis I. of France, was more numerous and splendid than that of any other subject. At York Place (now Whitehall) his residence was furnished with every luxury; and he built for himself at Hampton Court a palace, of which he was obliged eventually to make a present to the king. The Cardinal promoted learning with liberality: the university of Oxford is indebted to him for Christ Church College, and for several professorships, which with the college he founded in his native town of Ipswich, had only a short existence.

To circumstances connected with Henry's divorce from queen Katherine, Wolsey's fall is mainly attributable. An oppressive and illegal taxation had made him unpopular with the multitude, while at court there were powerful enemies labouring continually to turn the king's mind against the favourite, especially the queen Anne Boleyn. In 1529 two informations were filed against him in the Court of King's Bench, charging him with having received bulls from the pope without formal licence. Wolsey admitted the charge, and the court pronounced sentence, that he was out of the protection of the law, that his lands, goods and chattels were forfeited, and that his person was at the mercy of the king. He was ordered to retire to Esher, a country-house belonging to the see of Winchester; and was so closely shorn of all magnificence, as nearly to be wanting in the ordinary comforts of life. Many of his friends deserted him, but his humbler followers showed most faithful attachment to their master in his distress. Henry temporarily reinstated him in 1530. He was restored to the see of Winchester and the abbey of St. Albans, with a grant of 6000*l*., and of all other rents not parcel of the archbishopric of York. Even that archdiocese was afterwards restored. He arrived at Cawood Castle about the end of September, 1530, where he employed himself in magnificent preparations for his installation on the archiepiscopal throne. His enemies at court however were bent upon his ruin, and the Earl of Northumberland received orders to arrest him for treason, and to bring him to London. He proceeded towards London on his mule, but by the way he was attacked with a

dysentery. As he entered the gate of the monastery at Leicester, he said, 'Father Abbot, I am come to lay my bones among you;' and so the event proved. He died three days afterwards, Nov. 28, 1530.

WOLSINGHAM. [DURHAM.]

WOLVERHAMPTON. [STAFFORDSHIRE.]

WOLVERINE. [GULO.]

WOOD, in the widest sense, is all that part of a plant that exists between the pith and the bark; in a narrower sense, it is applied only to those bundles of tissue which are called Woody Tissue.

The two great classes of plants, Exogens and Endogens, yield very different kinds of wood in consequence of the manner in which their fibres are deposited. Endogens have no bark and are generally hollow in the middle. The stems of Exogens are solid, and as the tree increases in age the wood becomes more solid. Hence a distinction is made between the centre of the wood of the trunk and its circumference, the one being called heart-wood, the other sap-wood.

The peculiar resinous, gummy, oily, and other secretions, give to the various woods their different colour, smell, and taste. The colouring matter is sometimes deposited in such abundance as to render it useful for dyeing, as in log-wood, red sanders-wood, and other woods used as dyes. Some woods have volatile oils deposited in them, which render them odoriferous, such as sandal-wood, rose-wood, the wood of cedar, fir, and other trees. Frequently bitter and other secretions are deposited in wood, giving it a peculiar taste, and rendering it useful in medicine. The wood of the quassia is an example.

WOOD, or A' WOOD, ANTHONY, was born in Oxford, Dec. 17, 1632. His father was a gentleman of independent property. Anthony was educated at New College, Oxford, and Trinity College, Oxford. In 1647 he matriculated and entered Merton College.

His fondness for the study of antiquities was confirmed if not created by reading Dugdale's 'Antiquities of Warwickshire,' which came out in 1656, and he now began to transcribe the monumental inscriptions and arms in the parish churches and college chapels of the city and university of Oxford. In 1667 Wood went to London with a letter of introduction from Dr. Barlow, the head librarian of the public library, to Sir William Dugdale, by whose influence he obtained leave to peruse the manuscripts in the Cotton Library and the records in the Tower.

Wood having completed his 'History and Antiquities of Oxford,' the university offered him 100*l.* for the copyright, which he accepted. The work was translated into Latin under the inspection of Dr. Fell, and published at Oxford in 1674, in 2 vols. folio. In 1691 Wood published his 'Athenæ Oxonienses, an exact History of all the Writers and Bishops who have had their education in the University of Oxford from 1500 to 1695, to which are added the Fasti or Annals of the said University,' London, folio, 2 vols. in one. Wood died Nov. 29, 1695, aged 65. His manuscripts and books were deposited in the Ashmolean Museum.

In 1721 a second edition, 'corrected and enlarged with the addition of above 500 new lives from the author's original manuscripts,' was published in London, 2 vols. folio. Philip Bliss published at Oxford 'Wood's Athenæ Oxonienses continued to 1800,' 4to. 2 vols., 1813: to the 3rd volume, published in 1817, was added 'Fasti Oxonienses, or Annals of the said University, with Notes and Additions,' 4to.

WOOD, ROBERT, was born at Riverstown in the county of Meath, Ireland, in 1716. Having finished his studies at Oxford he visited Italy more than once, and in 1742 made a voyage as far as the island of Chios. In 1750, in conjunction with his friends Bouverie and Dawkins, and with the Italian architect Borra for their draftsman, he set out on an antiquarian expedition through Asia Minor and Syria. Before reaching Palmyra, Bouverie died of fatigue, but Wood and his remaining companions pursued their researches and labours with success. Almost immediately on his return he published the 'Ruins of Palmyra,' 1753, with 57 plates; and in 1757 the 'Ruins of Balbeck,' 47 plates. In 1759 he was made under-secretary of state by the Earl of Chatham. He died Sept. 9, 1771. After his death was published his 'Essay on the Original Genius and Writings of Homer,' &c., 4to., London, 1775.

WOODBINE. [LONICERA.]

WOODBRIDGE. [SUFFOLK.]

WOODCOCK. [SCOLOPACIDÆ.]

WOODDESSON, DR. RICHARD, was Vinerian professor in the university of Oxford. He published 'Elements of Jurisprudence, treated of in the preliminary part of a Course of Lectures on the Laws of England,' Lond. 1783, 4to.; 'A Systematical View of the Laws of England, as treated in a Course of Lectures read at Oxford during a series of years,' Lond., 1792, 3 vols. 8vo. Wooddesson died Oct. 22, 1822. The 'Lectures on the Law of England' were edited in 1834, in 3 small volumes, 8vo., by W. R. Williams, D.C.L., who observes in the preface that 'these lectures seem to be as superior to the Commentaries (of Blackstone) in accuracy of rules and justness of division and definition, as they are inferior in elegance of style and charm of narrative;' or, to speak in plain terms, the editor means to say that the Lectures are superior to the Commentaries in those matters which constitute the merit of a law book; and he is quite right.

WOOD-ENGRAVING is the art of producing raised surfaces, by excision, on blocks of wood, from which impressions can be transferred by means of a coloured pigment to paper, or other suitable medium, and generally applied to pictorial representations of objects.

The art of cutting both upon metal and wood for other purposes than those which are now understood as printing, ascends to a very remote antiquity. The Egyptians indeed seem to have made a very close approximation to printing, in their wooden stamps used for impressing characters on clay or other ductile materials; and printing from engraved wood-blocks has been practised by the Chinese probably from the 10th century.

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In Europe the first application of the art of wood-engraving took place in Germany, though the place is not exactly ascertained, but it is supposed to have been near Nürnberg, about the close of the 14th or beginning of the 15th century. It was probably first used for the production of playing-cards, the outlines of which were formed by impressions from wood-cuts, and the colouring filled up by hand.

The first wood-cut with a date known to be in existence is of 1423. It was discovered by Heineken, pasted on the cover of a manuscript in the library of the convent of Buxheim, near Memmingen in Suabia, and is now in the library of Earl Spencer. It represents St. Christopher carrying our Saviour on his shoulders across a river. It is by no means certain however that this print is the most ancient specimen we possess, as there are several others which, from their greater rudeness, have been held to have superior claims to antiquity.

The art however made rapid progress. The next great step was the production of block books and the adoption of moveable letters; and without entering into the disputed question of the dates of the 'Biblia Pauperum,' the 'Speculum Salvationis,' and others, they sufficiently prove the extension of its use, and many of the early books with moveable types were illustrated with pictorial wood-cuts. Maps also were engraved on wood. In an edition of Ptolemæus, printed in 1482 at Ulm, there are twenty-seven; and in a later edition, printed at Venice in 1511, the outline, with the mountains and rivers, is in wood, while the names are printed with type, and in two colours, no doubt by separate workings. In 1486 the improvement known as 'cross-hatching,' by which the bold and free effect of a pen-drawing was endeavoured to be attained, was shown in Breidenberg's 'Travels,' printed at Mentz. This invention has been usually attributed to Michael Wolgemuth, the master of Albert Dürer. Seven years later appeared the 'Nürnberg Chronicle,' also said to be by Wolgemuth, but who probably only furnished the designs, the execution of which is in a very superior style to that of any existing contemporary production: two fac-simile specimens are given in Jackson's 'Treatise on Wood-Engraving,' London, 8vo.

The art had now attained an excellence which induced artists of celebrity and talent to select it as the means of conveying their designs to the world. Among the most distinguished in this line was Albert Dürer, whose productions as a painter, and an engraver on copper and wood, are so numerous as to excite a doubt whether he was actually an engraver on wood himself, or whether he only put the designs on the blocks, leaving them for other hands to execute.

In the early part of the 16th century several artists of celebrity were either designers on wood or engravers. Books were also at this period profusely illustrated. The art was chiefly practised in Germany, where it was patronised by the Emperor Maximilian, for whom Burgmair produced the great work called 'The Triumphs of Maximilian.' The next great name in the annals of wood-engraving is Hans Holbein, whose 'Da of Death' was printed at Lyon in 1538, thou Bartsch and Jackson deny that he engraved wood, and Mr. Douce even questions his be the designer. From about 1545 to 1580 wo engraving continued to be much used for illustrating of books. From this period there little to be recorded of essential importance, the appearance of Bewick, to whom the revi of wood-engraving is chiefly to be attribut [Bewick.]

WOOD-GROUSE. [Capercaillie.]

WOODHOUSE, ROBERT, was born at N wich, April 28, 1773. His father was in busin in that city. Robert Woodhouse was sent to Ca College, Cambridge, in 1791, and he took first degree, and was senior wrangler and fi Smith's prizeman, in 1795. He gained a fello ship in his college, and the concerns of the coll and university, with his studies, private pup and writings, occupied his life. In 1820 he w elected to succeed Dr. Milner as Lucasian profes of mathematics; and in 1822 he was removed the Plumian professorship of astronomy and perimental philosophy, vacant by the death of I Vince. In 1823 he married Harriet, the siste William Wilkins, R.A., the architect, whom survived. In 1824, when the Observatory w completed at Cambridge, he was appointed superintendent. He died in London, Dec. 1827, and was buried in the chapel at Caius C lege. Besides papers in the 'Philosophical Tra actions,' Woodhouse published 'Principles of A lytical Calculation,' Camb., 4to., 1893; 'Eleme of Trigonometry,' Camb., 8vo., 1809; 'Treat on Isoperimetrical Problems, and the Calculus Variations,' Camb., 8vo., 1810; 'Treatise on A tronomy,' Camb., 8vo., 1812.

WOODHOUSLEE, LORD. [Tytler.]

WOOD-LARK, *Alauda arborea*. This ple ing songster, although resident in Great Brita is not plentiful. It much resembles the skyl in plumage, and has the hind claw long, a nearly straight. Sometimes it sings on t ground, oftener when perched on a tree, l generally while on the wing, describing a ser of widely-extended circles, and pouring out fo whole hour its rich gush of melody. This spec is the *Lulu* of the French; *Tutuilla* and *Tat vella* of the Italians; *Baumlerche* and *Waldler* of the Germans.

WOODPECKERS, *Picidæ*, a family of Sc sorial Birds. [Scansores.]

The *Picidæ* are especially constructed climbing up the bark of trees, and for obtaini from the crevices thereof the insects which con tute their food. The feet, though very short, unusually strong; the nails are broad and crook and the toes placed in pairs, that is, two forwa and two backward. As an additional and pow ful support in their rapid and perpendicular cent up the trunks of trees, their tail feath terminate in points, and are uncommonly hard, that when they are pressed against the bark, th assist the bird in its progress or in keeping position. The bill, destined for the laborious ope tion of penetrating the wood or stripping off t

bark of forest-trees, is admirably adapted for the purpose, being wedge-shaped, furnished with regular-sided angles, and in one species (*Picus principalis*) nearly of the colour and consistency of ivory, whence it has been termed the *Ivory-Billed Woodpecker*. The tongue is barbed at the point, capable of being protruded to a great length, and lubricated by a glutinous secretion. This mechanism enables the bird to introduce the tongue into holes and crevices, and under the loose bark of trees, to the destruction of insects there harboured.

Mr. G. R. Gray places the *Picidæ* (*Picus*, Linn., and *Bucco*, Linn.), his third family of *Scansores*, between the *Psittacidæ* and *Cuculidæ*. Mr. Gray's *Picidæ* include the following subfamilies and genera :—

1. *Bucconinæ*. Genera, *Laimodon, Bucco, Barbatula, Psilopogon, Capito, Caloramphus, Trachyphonus.*

2. *Picumninæ*. Genera, *Picumnus, Microlaptes, Sasia, Vivia.*

3. *Picinæ*. Genera, *Picoides, Hemicircus, Campephilus, Dendrobates, Picus.*

4. *Dryocopinæ*. Genera, *Campethera, Dryocopus, Chloronerpes, Chrysoptilus, Melanerpes, Tripsurus.*

5. *Celeinæ*. Genera, *Gecinus, Hemilophus, Celeus, Meiglyptes, Tiga, Brachypternus, Centurus, Leuconerpes.*

6. *Colaptinæ*. Genera, *Colaptes, Geocolaptes.*

7. *Yuncinæ*. Genus, *Yunx.*

European Woodpeckers.

Picus martius, Linn. (genus *Dryocopus*, Boie; *Dryotomus*, Sw.); *Pic Noir* of the French; *Picchio Grande* and *Picchio Nero* of the Italians; *Baumhacker* of the Germans; *Great Black Woodpecker* of the British.

This bird inhabits the north of Europe and Siberia principally; Norway, Sweden, Poland, and Russia, possess it; and it also appears in the Swiss mountains and those of Savoy and the Tyrol. It is rare in France and Germany. A few specimens have been shot in different parts of Great Britain.

Mr. Gould says, 'The flight of the present species is undulating, seldom protracted to any extent, but limited to a transit from tree to tree in the seclusion of its native woods. Its food consists of the larvæ of wasps, bees, and other insects; in addition however it devours fruits, berries, and nuts with avidity. The female selects the hollows of old trees, in which she deposits two or three eggs of an ivory whiteness.'

Picus viridis; Pic Verd of the French; *Pico Verde* of the Italians; *Grünspecht* of the Germans; *Green Woodpecker* and *Popinjay* of the British.

This bird inhabits the European continent from Scandinavia and Russia to Spain, Provence, and Italy; the wooded districts of Greece; and England and Scotland generally, where there are woods. It obtains its food both upon trees and on the ground. Its flight is short, undulating, and rather laborious. A very large proportion of the food of this species is derived from ants and their eggs. Every person who has lived in the country must frequently have seen this gay-coloured woodpecker feeding at some ant-hill. In captivity it is very fierce, and must be chained.

The nest is generally formed in an elm or ash tree, and when the birds are excavating the hole on which they have pitched for its place, they are said to carry their chips to a distance. The eggs, from 5 to 7, are pure white, and are deposited on the bare loose decayed wood.

Picus major, the *Spotted Woodpecker*, has an extensive range, more so perhaps than that of any other European Woodpecker. It is found in Denmark, Norway, Sweden, and Russia; Europe generally to Italy inclusive; England, Scotland, and Ireland.

The group to which this species belongs, though they occasionally descend to the ground, are far more arboreal in their habits and manners than the Green Woodpeckers represented by the *Picus viridis*. They exhibit great dexterity in traversing the trunks of trees and the larger decayed limbs, in quest of larvæ and coleopterous insects which lurk beneath the bark, and to obtain which they labour with great assiduity, disengaging large masses of bark, or so disturbing it by repeated blows as to dislodge the objects of their search. Their flight is rapid and short, passing from tree to tree, or from one wood to another, by a series of undulations. In their habits they are shy and recluse. The eggs, glossy-white, and from 4 to 6, are deposited at the bottom of a hole in a tree upon the decayed wood. This species more frequently makes that jarring noise for which the woodpeckers are distinguished, than either of the others, especially when disturbed from the nest.

Picus minor, Linn., the *Lesser Spotted Woodpecker*, is the least of the European Woodpeckers, but by no means the smallest of the family. It is pretty generally distributed over Europe, from Scandinavia and as far east as Siberia, to Italy. It is common in England, and frequents woods, orchards, nursery-gardens, and well-timbered parks. Near London it is very common, and may be seen by an attentive observer in Kensington Gardens, and in any of the parks in the neighbourhood. Nidification as in the previous species. Eggs, 4 or 5 in number, of a delicate flesh colour.

Asiatic Woodpeckers.

Picus squamatus. Locality, the Himalaya Mountains. Allied in form and habits to the Green Woodpecker.

Picus Shorii. Locality, the Himalaya Mountains. A brilliant three-toed species.

African Woodpeckers.

Picus Cafer. Locality, Caffraria. This species inhabits the forests, and lives on insects and their larvæ which harbour in the moss that grows on trees and under their bark.

American Woodpeckers.

Picus pileatus (genus *Dryotomus*, Swainson), the *Larger Red-Crested Woodpecker* of Catesby, *Pileated Woodpecker* of Pennant and others.

This bird is not unfrequent in well-timbered forests, from Mexico to Canada, at least to the 50° N. lat. Catesby says that these birds, besides insects which they get from rotten trees, are destructive to maize, by pecking holes through the

husks that enclose the grain, and letting in the wet. The female lays about six snow-white eggs in the cavity of a tree. Two broods are said to be produced in a season.

Picus principalis, the *Largest White-Bill Woodpecker* of Catesby; *Ivory-Billed Woodpecker* and *Large Log-Cock* of the Anglo-Americans. It inhabits Brazil, Mexico, and the Southern States of North America. It is seldom seen to the north of Virginia, and rarely in that State.

This bird subsists chiefly on ants, wood-worms, and other insects, which it pecks out of rotten trees. Many thousand acres of pine-trees in the Southern States have been destroyed in a single season by the insidious attacks of insects, which in the dormant state are not larger than a grain of rice. It is in quest of these insects that the indefatigable Woodpecker exercises his peculiar labour. In the sound and healthy tree he finds nothing which serves him for food.

WOOD SWALLOWS, a name given by the colonists of Australia to birds belonging to the genus *Artamus* of Vieillot; *Ocypterus*, Cuv.; *Lanius*, Linn. They are *The Swift Shrikes* of Mr. Swainson.

The members of this singular genus are distributed over New Guinea, Ceram, the Indian Islands, and the Continent of India, but are more numerous in Australia than elsewhere.

Of the Indian Wood Shallows, the *Artamus leucorhynchus* is an example. Sonnerat states that this bird flies with rapidity, poising itself in the air like the Swallows.

Of the Australian Wood-Swallows the *Artamus sordidus* may be taken as an example.

Mr. Gould states, that no Australian species of the genus *Artamus* possesses so wide a range from east to west, and also from north to south, as the *Artamus sordidus*. It is migratory in Van Diemen's Land, where it arrives in October, the beginning of the Australian summer, and after rearing at least two broods departs again northwards in November. On the continent of Australia this species breeds from September to December, and the situation of the nest is very much varied, but is generally in a bush. The eggs, usually four, are of a dull white, dashed with umber-brown.

This Wood Swallow, besides being the commonest species of the genus, has become a general favourite with the Australians, not only from its singular and pleasing actions, but by its often taking up its abode and incubating near the houses, particularly such as are surrounded by paddocks and open pasture lands skirted by large trees. It frequently flies in company with the common swallows and martins over ponds and lakes. Its voice greatly resembles that of the common swallow in character, but is much more harsh.

WOODS AND FORESTS. A considerable portion of the royal revenue consisted formerly of the rents and profits of the crown lands, which comprised numerous lordships and honours, together with forests and chaces: from the forests the principal source of profit lay in the fines or amerciaments levied for offences against the Forest Laws. The demesne lands which were retained by the king, or which came to the crown by forfeiture or otherwise, and were farmed out to su jects, were originally very extensive; but owi to the generosity or the necessities of differe kings, so large a part of them was granted awa that the Houses of Parliament frequently inte posed in order to prevent the total alienation the crown property. William III. had used th power of alienation so profusely, that upon th accession of his successor, a Civil List Act Anne, st. 1, c. 7) was passed, by which, in retu for 700,000*l.* a year, the Queen placed the her ditary revenues for her life at the disposal parliament. A similar arrangement has been mad at the commencement of the reign of each of h successors.

By the 46 Geo. III., c. 142 (altered by the 5 Geo. III., c. 65), an office of surveyor-general his Majesty's works and public buildings wa created; but this and some other offices are no incorporated with that of 'the Commissioners her Majesty's Woods, Forests, Land Revenue Works, and Buildings' (2 Will. IV., c. 1, s. 1 who are commonly called 'the Commissioners Woods and Forests,' which office or board owe its present permanent shape to the statute 10 Ge IV., c. 50 (amended and extended by 2 Wil IV., c. 1; 2 & 3 Will. IV., c. 112; and 3 & Will. IV., c. 69). The Commissioners, who ar not to exceed three in number, are appointed b letters patent (2 Will. IV., c. 1, s. 1).

The real property of the crown is derived fro three sources. The first consists of household pro perty in London (in Whitehall, St. James's, Re gent's Park, Tower, &c.); leasehold estates i different parts of the kingdom; fee-farm rent manors, mines, parks, palaces, and other propert in the occupation of her Majesty and others; th Rolls estate, and several other smaller branche of Revenue in England and Wales, Scotland an Ireland. The second branch of the crown pro perty consists of the royal parks of St. James' Hyde Park, and others, in various parts of th metropolis. The third branch consists of th royal forests, 17 in number, comprising the Ne Forest in Hampshire, of 60,000 acres; the Fores of Dean in Gloucestershire, about 20,000 acres and others; containing altogether about 110,00 acres. The gross income of Woods and Forest in 1849-50 was 349,097*l.* 5*s.* 2*d.*; the gross ex penditure, 192,102*l.* 17*s.* 11*d*; surplus income 156.994*l.* 7*s.* 3*d.*.

WOODSTOCK. [OXFORDSHIRE.]

WOODWARD, JOHN, was born in Derby shire, in 1665. He studied comparative anatomy and natural history at the seat of Sir Ralph Dutton in Gloucestershire, under the direction o Dr. Barwick, and received his degree of M.D from Archbishop Tenison. Woodward's attention to fossils was first excited by the shelly limestone of Gloucestershire, from which he conceived th notions of the successive deposition of strata which he afterwards applied to the explanation of th structure of the earth. By travelling over a grea part of England, he made himself, as he says, ac quainted with the 'present condition of the earth and all bodies contained in it;' collected th 'plants, insects, sea, river, and land shells,' &c

The result of his examinations and inquiries was 'A Natural History of the Earth,' which appeared in 1695. The author published in 1724 a defence of his system, 'Naturalis Historia Telluris illustrata et aucta.' To this work Woodward appended a Classification of Earths, Stones, Salts, Bitumens, Minerals, and Metals ('Methodica Fossilium in Classes Distributio),' dedicated to Sir Isaac Newton. A greater and more valuable work, in two volumes, published from Woodward's MSS. in 1728 and 1729 ('Attempt towards a Natural History of the Fossils of England'), closes the list of the geological publications of Woodward. The sincerity with which he prosecuted geology is evinced by the bequest of his collections to the university of Cambridge, and a fund for endowing a professorship of geology there. He died in 1728.

WOOL; WOOL TRADE. The term 'wool' is now applied almost exclusively to the fleece of the sheep. The distinction between wool and hair is more easily understood than described. Wool compared with hair is generally softer, more flexible, and more disposed to undergo the felting process, which imparts to it so much value in manufactures. Many of the wilder animals, such as the beaver, the racoon, the wild-cat, and the otter, produce both hair and wool, the hair forming the long and conspicuous outer fibres, and the shorter fibres of wool lying hidden beneath. The goats of Angora, or Ancyra, of Tibet, and of Cashmere, yield woolly fibres of great beauty, which are peculiarly suited for the weaving of shawls. For the manufacture of all kinds of woollen fabrics, except these shawls, the wool of the sheep is used. [SHEEP.]

In the time of Edward I. a duty was imposed on the exportation of British wool; and in 1337 an act was passed for prohibiting the exportation. From that time down to the reign of Charles I. the exportation of British wool was sometimes prohibited and sometimes allowed, under certain restrictions and duties. From 1660 down to 1824, the exportation was strictly prohibited. In the meantime duties, sometimes more, sometimes less, were laid on the importation of foreign wool. At length, in 1824, an act was passed making the duty on importation and exportation the same, viz. 1*d.* per lb. The duty on exportation was soon afterwards removed, and in 1844 the duty on the importation of foreign wool ceased altogether.

All the finer wools used to be brought from Spain; but in 1765 the Elector of Saxony imported into his dominions a few Merino sheep, which have had a most surprising influence on the trade of wool. The Saxony Merinos, instead of degenerating, improved upon their Spanish progenitors, and the wool afforded by them has almost driven the Spanish wool out of the English market. But the most remarkable circumstance in the recent history of the wool-trade is the rapid increase in the quantity of wool imported from Australia. This is shown by comparing the quantities imported in the three following years:—

1829 . . .	1,838.642 lbs.
1839 . . .	10,128,774
1849 . . .	35,879,171

The quantity imported from various countries in 1849 was as follows:—

Australia . . .	35,879,171 lbs.
Spain . . .	127,559
Germany . . .	12,750,011
Other European Countries	11,432,354
South America . .	6,014,525
Cape of Good Hope .	5,377,495
East Indies . .	4,182,853
All other parts . .	1,004,679
Total . .	76,768,647

In 1848 the quantity of wool exported was 4,000,000 lbs.

WOOL-TREE, a species of *Eriodendron*, a genus of plants belonging to the natural order *Sterculiaceæ*. The wool-trees are large trees, with a spongy wood. There are six species of Eriodendron, five of which are natives of America, and one of Asia.

WOOLER. [NORTHUMBERLAND.]

WOOLLEN AND WORSTED MANUFACTURES. Wools are divided into two great classes—*Clothing-Wools* and *Combing-Wools*, or *Short-Wools* and *Long-Wools;* and the fabrics woven from them are termed *Woollens* or *Worsteds* according as the one or the other is employed. Clothing-wools possess in high perfection that peculiar property which enables the fibres to 'felt' or interlace one among another, and to form thereby the dense compact material of which men's garments are so largely made in this country; whereas combing-wools, though long in fibre, are deficient in the felting property, and are therefore employed for stuffs, merinos, hosiery, and a large number of fabrics which do not undergo the felting process.

Woollen Manufacture.—The sorting of the wool is the first operation. Each pack of wool contains many different qualities, according to the part of the fleece whence it was taken, and other circumstances; and much tact and discrimination are called for in the separation. The sorter has to make his selection in relation to the *fineness*, the *softness*, the *strength*, the *colour*, the *cleanness*, and the *weight* of the wool; and in reference to these qualities he separates the wool into many parcels. When the proper kinds are selected, they are next *washed* or *scoured* with soap and alkali, to free them from the grease which invariably attaches to them.

If the cloth is dyed in the wool, that operation succeeds the scouring; but if dyed 'in the piece,' many other processes intervene; and it depends a good deal on the kind of colour as to which plan is followed. Supposing the dyeing to be completed however, the wool undergoes the process of *willying* or *willowing*, which is somewhat analogous to the *batting* or *scutching* in the cotton-manufacture; the object being to open and disentangle the locks of wool, and cleanse them from sandy and other loose impurities. The willowing machine contains a number of revolving spikes which tear asunder the fibres of the wool, and a fan which blows away the dust from them. There are frequently impurities which cannot be removed by the willy; and such are afterwards picked out by

boys or women, called *Wool-Moaters*, or *Wool-Pickers*. A further opening of fibres results from the process of *scribbling;* but before this is effected, the wool undergoes that of *oiling;* it being spread out on a floor, sprinkled with olive-oil, and well beaten with staves. The *scribbling-machine* is very similar in its principle of action to the *carding-engine*. [Cotton Spinning.]

The cardings into which the wool is brought by this operation, and which are short pieces in the form of rolls or sticks, are then spun into yarn for the use of the woollen-weaver; the process of spinning being generally effected by means of the *slubbing-billy* or *slubbing-machine*, and afterwards by the common jenny or mule-spinning machine; the slubbing-billy bringing the wool to the state of a soft weak thread, and the spinning-machine giving it the proper firmness and hardness for yarn.

The process next following that of spinning is weaving, by which the yarn is worked up into a textile fabric. [Weaving.] Formerly woollen cloths were principally woven by hand-weavers; but the power-loom is every year superseding more and more the common loom.

As the wool has been dressed with oil before spinning, and with size before weaving, it becomes necessary to cleanse it from these impurities immediately after the weaving. This is the object of a second scouring process, in which the cloth is beaten with wooden mallets in a kind of trough or mill; soap and water being let in upon it first, and then clear water. Being then carried to the drying-room, or the tenter-ground, it is stretched out by means of hooks on rails, and allowed to dry in a smooth and extended state. It is then taken into a room and examined by *Burlers*, who pick out all irregular threads, hairs, or dirt. After this it is ready for the important process of *fulling* or *felting*, which imparts to woollen goods that peculiarity of surface whereby they are distinguished from all others. A large mass of cloth folded into many plies is put into the fulling-mill, where it is exposed to the long-continued action of two heavy wooden mallets or stocks. Superfine cloth has four fullings of three hours each, a thick solution of soap being spread between each layer of cloth every time. This process, besides felting or interlacing the fibres together, thickens the cloth remarkably, but diminishes it both in length and breadth nearly one-half.

In the fulled state the cloth presents a woolly and rough appearance, to improve which it goes through the processes of *teazling* or *raising*, and *shearing* or *cutting*, the object of the first being to raise the ends of the fibres above the surface, and of the second to cut them off to a uniform level. The raising of the fibres is effected by thistle-heads, teazling-cards, or wire-brushes. Teazles are the seed-pods of the *Dipsacus Fullonum*, and are used by hand [Teazle]; but sometimes wire-cards are used, fixed to a machine called a *gig-mill*.

When the ends of the fibres have been thus raised to the surface, they are next sheared or cropped, a process of great beauty and singularity. Originally this process was performed by means of large hand-shears, the cloth being stretched over a stuffed table, and the workman proceeding to clip the ends of the fibres in a regular and equable manner; but the process is now more frequently conducted by a machine, which causes a revolving circular furnished with cutters to travel horizontally over the cloth, and shear it.

When the cloth has been raised and sheared (which operations are repeated two or three times for superfine cloth), it is brushed by a machine consisting of a system of brushes affixed to cylinders; the cloth being exposed at the same time to the action of the brushes and of steam. A few subsequent operations are carried on, having for their object the imparting of smoothness, gloss, &c., to the cloth, preparatory to its being placed in the hands of the dealers.

Worsted Manufacture.—All combing-wools are longer in fibre than the clothing-wools, but they are subject to the division into 'long' and 'short' combing-wools; the long, varying from 6 to 12 inches in length, being used principally for coarse worsted goods, and the short, from 4 to 7 inches, being used for hosiery and some other purposes.

After the wool has been sorted, washed, and scoured from the adherent grease, and dried in a heated room, it is carried to a machine called a *plucker*, containing a pair of spiked rollers, by the action of which the wool is cleansed, separated, and the fibres straightened, preparatory to the process of *combing*. This combing is sometimes performed by hand, by means of two instruments filled with spikes, between which the wool is drawn till the fibres assume a regular arrangement; but a very efficient machine, somewhat on the principle of the carding machine, is now frequently used for this purpose.

When the wool has been combed either by hand or machine, it is transferred to the *breaking-frame*, the object of which is to open out any fibres which may have escaped the action of the combs, and to bring the wool into the form of a roll or narrow belt. This roll is then lapped round a large bobbin or cylinder; then passed a second time through a breaking-frame; and then subjected to the action of a machine analogous in principle to the drawing-frame of the cotton manufacture; the object being to extend the length, diminish the thickness, and equalise the number of fibres of the roll or sliver. Hitherto the woolly fibres are merely slightly coherent, without having any twist; but they are now passed through a *roving-machine*, preparatory to the process of spinning. The roving and spinning are conducted much in the manner described in the article Cotton Spinning. When spun, the worsted yarn is wound on a reel, and is then made up into hanks.

Here terminate the operations of a worsted-mill. The dyeing of the yarn, and the weaving into the various kinds of textile fabrics, lead us to other departments of industry. [Dyeing; Weaving.]

Classification and Trade in Woollen and Worsted Manufactures.—Plain *broad-cloth* is a specimen of plain weaving, followed by the fulling process; whereas *kerseymere* is a twilled fabric, similarly fulled. *Serges* are twills, having worsted

warp and coarse woollen weft. *Blankets* are made of very soft yarn, afterwards worked up into a kind of pile by milling; and many varieties of coarse cloth are of analogous structure. *Bombazeen* is a twilled mixture of worsted and silk; *Poplin* is an untwilled mixture, showing more silk than worsted at the surface. Goods called *Saxonies* and *Orleans* are made of woollen, sometimes mixed with cotton, and afterwards printed. *Stuff* is made wholly of worsted; while *Merino* is a fine woollen twill, sometimes printed. The material called *Cashmere*, if properly so named, is made of the shawl-goat wool, much in the same way as merino; but most of the fabrics so called are made of sheep's wool. *Challis* is a mixture of woollen weft with silk warp, and is generally printed. *Mousseline-de-Laine* was originally all wool, but is now frequently mixed with cotton, and generally printed. *Norwich Crape*, unlike common crape, is composed of wool and silk, something like challis, but without being printed. *Crêpe de Lyon* is formed of worsted and silk; and *Italian Net* of worsted only. These examples are only intended to indicate the sources of the varieties in woollen and worsted goods, for to enumerate all the varieties themselves would be nearly impossible. This is particularly the case in respect to *Waistcoatings*, where fancy-weaving adds to the sources of diversity.

Mr. McCulloch made a rough estimate, a few years ago, that the value of woollen and worsted goods made in the United Kingdom averages about 23,000,000*l.* yearly; that about two-fifths of this sum are paid in wages; and that about 350,000 persons are directly employed in it. But it is admitted that the data for forming such estimates are very insufficient.

The value of all kinds of woollens, worsteds, worsted hosiery, and woollen and worsted yarn, exported from Great Britain in 1830 was estimated at 4,728,666*l.*; in 1840, at 5,327,853*l.*; and in 1849, at 8,420,342*l.*

WOOLLETT, WILLIAM, the engraver, was born at Maidstone in Kent, in 1735. He learned his art of John Tinney, an obscure engraver in London, but he soon adopted a style of his own, acquired early a great reputation as a landscape engraver, and was appointed engraver to George III. In foliage, water, and rocks, Woollett was particularly successful, and is still unrivalled; but figures, and especially in flesh, he was less so. In the latter part of his life Woollett took to historical engraving; and also in this department he has produced some of the finest plates of which the English school of engraving can boast: the Death of General Wolfe, and the Battle of the Bogue, both after West, are considered his best historical pieces. Of his landscapes his masterpieces are those which he engraved after Wilson. He engraved also after Claude, Zuccarelli, and others. Woollett died in London in 1785. There is a basso-rilievo tablet to him in the cloisters of Westminster Abbey.

WOOLWICH. [KENT.]

WOOTTON-BASSET. [WILTSHIRE.]

WORCESTER, the capital city of Worcestershire, a municipal borough, parliamentary borough, and the see of a bishop, 112 miles W.N.W. from London by the road, and 140 miles by the London and North Western Railway, is situated on the E. bank of the Severn, over which there is a bridge connecting the city with a suburb on the W. bank. The Worcester and Birmingham Canal passes round the city on the E. and S. to the Severn. The older, central, and best part of Worcester is built on a ridge, which rises about 60 feet above the river, and terminates S. beyond the cathedral, and N. at the Barbourne Brook. The Lowesmoor valley sweeps round it on the east, and extends to the Severn on the north and south. The worst parts of the city lie in this valley, and along the margin of the Severn towards the south. The houses are generally built of red brick; the cathedral, churches, and some of the public buildings, of a reddish and rather soft sandstone. The principal streets are broad and clean, paved, and lighted with gas. The cathedral has two transepts. The entire length is 425 feet; the western transept is 128 feet, the eastern 120 feet; the length of the nave is 174 feet, the height 67 feet, and the width 30 feet; the tower, which rises from the intersection of the western transept, is 193 feet high. There is a Lady Chapel at the east end, cloisters on the south side, and a chapter-house on the east side. Besides the cathedral, there are 12 churches and several chapels. The other public buildings are the guildhall, county courts, county gaol, county infirmary, union workhouse, almshouses, &c. There are several schools, including a free grammar-school. The staple manufactures are porcelain and gloves. Worcester existed in the Saxon times, and was frequently attacked, plundered, and sometimes burnt, during the civil wars of the kingdom. The city was formerly walled, and was defended by a castle, which stood on the south side of the cathedral, but of which there are no remains.

The municipal borough is divided into 6 wards, and is governed by 12 aldermen (of whom one is mayor) and 36 councillors. The population of the city in 1841 was 25,401. The parliamentary borough returns 2 members: population, 26,306.

WORCESTER. [MASSACHUSETTS.]

WORCESTER COLLEGE, Oxford, originally Gloucester Hall, was founded in 1714, for a Provost, 6 Fellows, and 6 Scholars, the scholars to be elected from the schools of Bromsgrove, Feckenham, Worcester, Hartlebury, or Kidderminster, or, in default of persons properly qualified in these schools, from any other endowed school in the county of Worcester. The college has since received considerable endowments. The foundation at present consists of a Provost, 21 Fellows, 16 Scholars, and 3 Exhibitioners. The number of members upon the college-books in Jan., 1848, was 284.

The buildings of Worcester College occupy two courts. The south side of the inner court still consists of the old buildings which belonged to Gloucester Hall. The chapel, a plain modern edifice, forms part of the general design for rebuilding the whole college. It was begun, together with the hall and library, in 1720. The range of new buildings on the north side of the

inner court was not completed till 1776. The hall, forming the south wing of the entrance-court, was finished in 1784.

WORCESTERSHIRE, an inland county of England, is bounded N. and N.W. by Staffordshire and Shropshire, E. by Warwickshire, S. by Gloucestershire, and W. by Herefordshire. There are several detached portions of this county: the most important contains the town of Dudley, and is surrounded by Staffordshire. The greatest length of the county N.E. to S.W. is 45 miles; the greatest breadth E. to W. is 34 miles. The area is 723 square miles. The population in 1841 was 233,336.

Surface.—Worcestershire is generally a flat country; on the eastern and western sides are two nearly parallel ranges of hills, which partly bound and partly intersect it: the intermediate space is for the most part a fertile plain. The eastern range of hills commences on the N. in the Clent Hills, extends to N.W. of Bromsgrove, and terminates N. of Evesham. The western chain commences in the neighbourhood of Bewdley, and runs S. to the great chain of Malvern Hills, in which it terminates. The principal hills not comprised in or bordering on these chains are Bredon Hill, about 3 miles S. of Pershore, Broadway Hill, near the S.E. extremity of the county, and a small line of hills extending from Croome northwards towards Worcester.

Geology.—The geology of Worcestershire has been fully detailed by Mr. Murchison, in his valuable work on the 'Silurian System.' The county is composed for the most part of new red sandstone, lias, and oolite; other formations are visible in the chain of the Malvern Hills, in the districts bordering on Tenbury, Bewdley, and Dudley, and in the Lickey and neighbouring hills in the northern part of the county. The new red sandstone comprehends that district which is watered by the Severn, together with the N.E. part of the county. The lias formation is found at Pershore and Evesham, and in the vales watered by the Avon. The portion of the Malvern Hills within the boundary of Worcester consists of trap; while the Silurian rocks, the Carodoc Sandstone, Ludlow Rock, and Wenlock Limestone, appear in the northern portion of the chain. The lower coal and ironstone beds are found at its termination, N. of Abberly Hill, in the Forest of Wyre. Here also is found the old red sandstone formation upon which Tenbury stands. Bewdley is situated near the junction of the lower red sandstone with the coal-field of the Forest of Wyre. The town of Dudley stands on the thicker coal-measures. In the neighbourhood of Droitwich and Stoke Prior are saliferous beds, from which a large quantity of salt is manufactured.

Rivers.—The principal rivers are the Severn, the Avon, the Teme, and the Salwarp. The Severn is described under SEVERN AND WYE. The Avon enters the county on the E. near Cleeve Prior, and, flowing in a very winding course past Evesham and Pershore, quits Worcestershire about a mile from Tewkesbury, and soon afterwards falls into the Severn. It has been rendered navigable by locks throughout the whole length of its course through Worcestershire, which is nearly 20 miles. Vessels of 60 tons can reach Stratford-upon-Avon. The Teme, which bears somewhat of the character of a mountain stream, enters Worcestershire at its western extremity, and passing by Tenbury, forms here, as during other parts of its course, the boundary of Worcestershire with Herefordshire. It falls into the Severn about three miles south of Worcester: it is not navigable. The Salwarp, a small river, rises N. of Bromsgrove, flows through Droitwich, and falls into the Severn near Claines.

Railways.—The Birmingham and Bristol Railway passes through Worcestershire to the E. of Bromsgrove, Droitwich, Worcester, and Tewkesbury, and there are branches from the main line to Worcester and to Tewkesbury.

Canals.—The northern part of the county is intersected by several canals. The chief canal reaches from Birmingham to Worcester, passing through the salt-district of Droitwich, and having two branches, one to Dudley by way of Halesowen, and the other from King's Norton to Stratford-upon-Avon. From Dudley there is a canal to Stourbridge, Kidderminster, and Stourport, at which last place it opens into the Severn.

Agriculture.—The climate of Worcestershire, especially in the middle, south, and west of the county, is remarkably mild and healthy, and the fruits of the earth are brought to early maturity. The vales of Severn and Avon are but little raised above the level of the sea; and it has been observed that an elevation of 60 yards make a difference in climate equal to a degree of latitude N., soil and other circumstances remaining the same. The higher parts of the county, between Bromsgrove and Birmingham, have consequently a later harvest. The higher hills, such as the Malvern Hills, are proportionally colder and later. They tend to shelter the vales between them from the cold winds, and add to the mildness of the climate there. The Vale of Severn contains some extremely rich alluvial soils, which are admirably adapted for pastures. The banks of the Avon also are rich, and consist mostly of meadows and pastures. Along the banks of the Teme are many hop-gardens and orchards, and the lower parts form rich meadows. One-half of the county consists of rich loams and clay soils.

The farms are generally small, but are gradually enlarging by uniting several of them under one tenant. Leases are not generally granted. The average produce of wheat in Worcestershire is higher than in many other counties. Potatoes are raised in great abundance for the supply of Birmingham and other large towns. Wolverley sands have long been famous for the growth of carrots and for raising carrot-seed. The ground is trench-ploughed. Orchards are numerous, but many of the trees are old. There is no peculiar breed of cattle. They are chiefly obtained from Herefordshire and South Wales. The sheep are mostly of the Leicester breed, which suit the rich pastures. On the Malvern Hills are some small hardy sheep, without horns, with gray faces and legs, which make excellent mutton. The horses for farm-work are mostly of the strong black breed.

Divisions and Towns.—Worcestershire is divided into 5 hundreds. It is in the diocese of Worcester. It is in the Oxford circuit, and the assizes are held at Worcester. For parliamentary purposes it is divided into East Worcestershire and West Worcestershire, each of which returns 2 members; besides which 2 members are returned for Worcester and 2 for Evesham, and 1 each for Bewdley, Droitwich, Dudley, and Kidderminster: total, 12 members.

The following are the principal towns, with the population of each in 1841 :—

Bewdley. [BEWDLEY.]

Bromsgrove, a market-town, 13 miles N.N.E. from Worcester, is situated on the small river Salwarp. The town consists principally of one good street, a mile in length. It contains a parish church, a market-house, and an endowed grammar-school. Nail-making is the principal trade. Population of the parish, 9671.

Droitwich, a market-town, municipal borough, and parliamentary borough, 7 miles N.N.E. from Worcester, is situated on the Salwarp, in a narrow valley. The chief trade of Droitwich arises from its salt-springs, from which salt has been made from time immemorial, but the quantity has been much increased since about 1725, by sinking the pits to a greater depth, where the brine was found to be much salter, and from which it rose as before to the surface. The quantity of salt now made is not less than 30,000 tons a year. The Worcester and Birmingham Canal passes by Droitwich, and communicates with the Severn. The Exchequer-House, where the duties on salt are paid, is an ancient structure with stained-glass windows. There are two churches and two prisons. The municipal borough is governed by 4 aldermen and 12 councillors: population, 2832. The parliamentary borough returns one member: population, 6588.

Dudley, a market-town and parliamentary borough, 26 miles N. by E. from Worcester, is situated in an isolated part of the county, which is surrounded by Staffordshire. The houses are generally neat and well built, and the streets clean and well paved, and lighted with gas. It contains a handsome modern parish church, a chapel of ease, and several places of worship for dissenters. The principal trade of Dudley consists in the smelting and working of iron ore, with which the whole neighbourhood abounds, as well as with coal and limestone. The articles manufactured are various iron utensils, nails, and glass. There are some interesting remains of Dudley Castle. Population of the town, 17,077. The parliamentary borough returns one member: population, 31,157.

Evesham, a market-town, municipal borough, and parliamentary borough, 15 miles S.E. from Worcester, is situated on both banks of the river Avon, over which there is a stone bridge. The two principal streets are wide and clean, and the town has a cheerful appearance. The Vale of Evesham is famous for the richness of its soil; and large portions of land near the town are laid out in gardens, which supply the neighbouring towns and villages with vegetables and fruit. Evesham owes its importance to an abbey which was established there at a very early period. Of this large abbey there are now no remains except a gateway, and a beautiful campanile, or bell-tower, which was commenced in 1533. There are two fine old parish churches, one of which has been restored. The municipal borough is governed by 4 aldermen (one of whom is mayor) and 18 councillors: population, 4245. The parliamentary borough, which returns 2 members, is coincident with the municipal borough.

Kidderminster, a market-town, municipal borough, and parliamentary borough, 15 miles N. by W. from Worcester, is situated on both sides of the Stour, and the Worcester and Stafford Canal also passes through it. The town is generally well built, paved, and lighted with gas. It contains a town-hall, a grammar-school, a union workhouse, a large parish church of perpendicular architecture, a modern gothic church, and several places of worship for dissenters. Kidderminster has for many years been celebrated for the manufacture of carpets. The municipal borough is divided into 3 wards, and is governed by 6 aldermen and 18 councillors. Population of the parish, 20,753. The parliamentary borough returns one member: population, 15,427.

Malvern or *Great Malvern,* a village, 8 miles S.W. from Worcester, is situated at the eastern side of the Malvern Hills. The village is a favourite watering-place, and is much resorted to by invalids, not only for its medicinal springs, but for the salubrity of the situation. The wells are between Great Malvern and Little Malvern, a small village about three miles to the south. Great Malvern is neatly built, and contains a fine old church, which formerly belonged to a monastery. Population of the parish, 2768.

Pershore, a market-town, 9 miles S.E. from Worcester, is situated on the W. bank of the Avon, which is here navigable for boats. The town is well built and well paved. The inhabitants are chiefly employed in the manufacture of stockings. The town contains two parish churches. There are some ruins of a Benedictine Abbey. Population of the town, 2813.

Redditch, a large village, 16 miles N.E. from Worcester. The inhabitants are chiefly employed in the manufacture of needles, which are here made to a large amount and of superior quality. Population, 3314.

Shipston-on-Stour, a market-town, 30 miles S.E. from Worcester, is situated on the river Stour, in an outlying portion of the county, in Warwickshire. It was formerly a very large sheep-market, and Sheepston has become Shipston. The town has no trade of any consequence. Population of the parish, 1846.

Stourbridge, a market-town, 23 miles N. from Worcester, stands on the S. side of the Stour, over which there is a stone bridge forming the communication with Staffordshire, and there is also a branch from the Worcester and Stafford Canal. The town is rather irregularly built on a gentle declivity, but the general appearance is handsome. The market-house is a spacious modern structure. There is a small theatre. The

church was built in 1742. There is a free grammar-school, founded by Edward VI. The manufactures consist chiefly of iron, glass, and fire-bricks made of the Stourbridge clay. Population of the township, 7481.

Stourport, a market-town, 12 miles N. by W. from Worcester, is situated in the angle formed by the confluence of the Stour with the Severn. It has become a thriving place in comparatively recent times, in consequence of improvements in the inland navigation. Besides being situated near the confluence of the Stour and Severn, the Stafford and Worcester Canal, which communicates with Dudley, Stourbridge, and Kidderminster, enters the Severn at Stourport. There is an extensive basin with wharfs and warehouses for the accommodation and as a general dépôt of the trade between the west and central portions of the kingdom. The houses are chiefly built of brick, and the general appearance of the town is neat and thriving. The iron bridge over the Severn consists of a single arch, of 150 feet span. Population of the town, 3112.

Tenbury, a market-town, 22 miles W.N.W. from Worcester, is situated on the S.E. bank of the Teme, which is here crossed by a stone bridge, forming the communication with Shropshire. The Kyre, a small but rapid river, falls into the Teme at the upper end of Tenbury. The town consists chiefly of three streets, and has a modern church. Population of the parish, 1849.

Upton-upon-Severn, a market-town, 10 miles S. from Worcester, is a neatly-built and thriving town, situated on the S.W. bank of the Severn, over which there is a stone bridge communicating with a suburb on the N.E. bank. The town contains a modern market-house, including a court-room and assembly-room. The church is also modern. Population of the parish, 2696.

Worcester is the capital city. [WORCESTER.]

History and Antiquities.—Of the early history of Worcestershire little is accurately known: there are however many evidences of its occupation by the Romans. During the Heptarchy Worcester was the principal Mercian see, and the inhabitants of the district were under ecclesiastical government. After the Conquest the form of government was changed, and Earls of Worcester were created, and had the civil power confided to them.

The antiquities of this county are not remarkable. Three Roman roads crossed the county. Ancient encampments may be traced at Malvern, at Bredon, and on the hills at Woodbury and Witchbury. There are several remains of ecclesiastical houses, the chief of which are the abbeys of Malvern, Bordesley, and Evesham.

WORDSWORTH, WILLIAM, was born at Cockermouth in Cumberland, April 7, 1770. He received his education at Hawkshead grammar-school. In 1787 he entered St. John's College, Cambridge, where in 1791 he graduated B.A. From an early age he had been fond of poetry, and during youth he devoted himself eagerly to poetic studies. In 1793 the first fruits of these studies appeared in his 'Evening Walk,' 4to., which was quickly followed by 'Descriptive Sketches in Verse,' the result of a pedestrian tour over the Alps, made soon after quitting college. Two o three years later Wordsworth formed an acquaint ance with Coleridge, which soon ripened int friendship; and in 1798 they made a journey int Germany. Through Coleridge Wordsworth becam acquainted with Southey, and their intimacy ha no trifling influence on the intellectual charácte and fame of each. The 'Lyrical Ballads,' the re sult of his acquaintance with Coleridge, appeare in 1798.

In 1803 he married his cousin, Mary Hutchin son, and settled among his favourite Cumberlan mountains, where the remainder of his caln uneventful life was spent. His circumstances ha been rendered comparatively easy by the kind ness, in the first place, of a friend, and then b the appointment, which the intervention of th Earl of Lonsdale had procured for him, of Distri butor of Stamps for Cumberland and Westmor land. He lived for a while at Grasmere, whenc he removed to the beautifully-situated cottage o Rydal Mount so well known to every lake tourist Coleridge, and soon after Southey, went to resid in his neighbourhood, to which, and to their int macy, they owed the absurd designation of th Lake Poets, and their poetry, which had so fe points of similarity, that of the Lake Schoo In 1807 'Poems,' 2 vols., and in 1809 his 'Ya row Unvisited,' and some other minor poem appeared. In 1814 he published, in 8vo., 'Th Excursion, being a Portion of the Recluse,' th longest and most elaborate of his poems. In 181 he published 'Peter Bell' and the 'Waggoner in 1819, the 'White Doe of Rylstone;' and i 1820, the 'River Dudden,' a series of sonnet suggested by rambles along the banks of th small river Duddon, in Cumberland. His 'Eccl siastical Sonnets' appeared in 1832, and in 183 'Yarrow Revisited,' together with other sho poems.

In 1835 he received a pension from gover ment of 300*l.* a year, with permission to resig his office of Distributor of Stamps in favour his son. In 1837 he collected and newly a ranged his poems, and published them in si volumes. A year or two later he published 'Th Borderers,' a dramatic fragment written long pr viously. The 'Prelude,' which is the first part the poem of the 'Recluse,' the 'Excursion' bein a second part of the same poem, was publishe some months after his death. On the death Southey in 1843 he was appointed Poet Laureat He died April 23, 1850, having just complete his 80th year. His remains were interred in th churchyard of Grasmere. A Life of him, by h nephew Dr. Wordsworth, has been announce (March, 1851) as nearly ready for publication.

WORKHOUSE. [POOR LAWS AND PAUPE ISM.]

WORKINGTON. [CUMBERLAND.]

WORKSOP. [NOTTINGHAMSHIRE.]

WORMHOUT. [NORD.]

WORMS. [ANTHELMINTICS; ENTOZOA VERMES.]

WORMS, a town in the province of Rheinhe sen, in Hesse-Darmstadt, is situated in 49° 37′ lat., 8° 22′ E. long., near the left bank of t

Rhine, 25 miles S. from Mainz, and has 8360 inhabitants. The city is said to occupy the site of the Roman fortress Borbitomagus, or Augusta Vangionum, which was destroyed by the Vandals and Huns. The town was rebuilt by the Franks about 475, and called Worms. It was for some time the residence of Charlemagne, who held in its vicinity those primitive legislative assemblies which, meeting in May, were called Champs de Mai. Several diets of the German Empire were held at Worms, among others that of 1521, at which Luther appeared before the emperor Charles V. The population in the time of the Hohenstaufen amounted to 60,000, and even after the Thirty Years' War was still 30,000. In 1689 it was burnt by the French, and only the old cathedral was spared. Since that time it has never recovered; some portions have been indeed rebuilt, but within the old circuit of its walls are large vineyards and gardens. The most remarkable edifice is the cathedral, a plain gothic building, with two towers at each end. Worms has a gymnasium, manufactories of sugar-of-lead and tobacco, several tanneries, and a good trade in corn, cattle, and wine.

WORMWOOD. [ARETEMISIA.]

WORSTED. [WOOLLEN AND WORSTED MANUFACTURES.]

WORTHING, [SUSSEX.]

WOTTON, SIR HENRY, was born March 30, 1568, at Boughton Hall, in Kent, where his ancestors had resided for many generations. Having received the rudiments of learning from a resident tutor, he was sent to Winchester School; thence, at the age of sixteen, he was removed to New College, Oxford, whence two years after, in 1586, he transferred himself to Queen's College. He took his degree of A.B. in 1588. In 1589 his father died, and soon after Wotton left Oxford and travelled on the Continent. After his return he attended the Earl of Essex, as one of his secretaries, in his expedition against the Spaniards, and in Ireland, in 1599. He afterwards went to Rome and Florence. A short time after his return to England he received the honour of knighthood from James I., and was afterwards sent as ambassador to Venice, to the United Provinces, to Savoy, and to some of the German courts. In 1624 the king appointed him provost of Eton College, and he was instituted in 1625. Conceiving himself bound by the statutes to enter into holy orders, he had himself ordained deacon in 1627; and he retained his office till his death in December, 1639.

Sir Henry Wotton's principal writings are contained in the collection entitled 'Reliquiæ Wottonianæ,' first published by Izaak Walton, with a Life of the author, 8vo., 1651, and afterwards, with additional matter in each impression, in 1654, 1672, and 1685.

WOTTON, WILLIAM, D.D., was born Aug. 13, 1666, at Wrentham in Suffolk, of which parish his father, the Rev. Henry Wotton, was rector. He was taught Latin, Greek, and Hebrew by his father. In 1676, before he was ten years old, he was admitted of Catherine Hall, Cambridge, where, in addition to the learned languages, he studied Chaldee, Syriac, and Arabic. In 1679 he took his bachelor's degree, and soon after obtained a fellowship at St. John's. He took orders and got some church preferment. He died at Buxted, Essex, in 1726.

In 1694 he published his first work, by which he is best known, his 'Reflections on Ancient and Modern Learning,' which is a defence of the superiority of the ancients, in answer to Sir William Temple. Wotton's work called forth Swift's 'Battle of the Books,' which Swift wrote to assist the cause of his friend Temple.

WOTTON-UNDER-EDGE. [BUCKINGHAMSHIRE.]

WOUNDS, in Surgery, are solutions of the continuity of the soft parts of the body effected by some external agent, and attended with a greater or less amount of bleeding. Wounds vary in their character according to the kind of instrument by which they have been produced, as well as the greater or less amount of force with which it has been applied.

Incised Wounds. The effect of a cut on any part of the body is to produce a gaping space, from which blood in most cases issues, and pain is felt. The blood arises from the blood-vessels of the part having been cut through or wounded, and the pain is caused by a similar injury to the nerves. The immediate danger of incised wounds does not so much arise from the extent of parts divided as upon the kind and size of the blood-vessels which are injured. The vessels injured in incised wounds are either arteries or veins, and each require attention from the surgeon, as the bleeding from them requires somewhat different treatment. Blood flows from both ends of a divided artery, but always in greater quantity from the orifice nearest the heart. When the veins are wounded, the blood which is poured out is of a dark colour, and comes not by jerks, but in a uniform stream.

Treatment.—In the treatment of incised wounds the objects in view are, first, to arrest the bleeding; second, to remove all foreign bodies that may have been introduced into the wound; and thirdly, to promote the union of the divided parts. To arrest the bleeding is easily accomplished by bringing the edges of the wound together, in superficial wounds, and wounds where no large arterial or venous trunks have been injured; but where large vessels have been injured, other means will be found necessary. When the bleeding from a wound is great, the first thing that can be done to arrest it is to compress the trunk of the artery which supplies the part. This may be done by means of the tourniquet, or a bandage so constructed as to press down upon the artery.

The most important means however of stopping bleeding from wounds is the ligature. This consists in seizing the wounded ends of the artery with a pair of forceps, or passing through it a tentaculum, and then tying up the artery in the same way that the mouth of a full sack is usually tied. Other means of arresting hæmorrhage are sometimes employed, such as the application of styptics, sponge, the actual cautery, caustics, &c.

These however are seldom advisable in the case of incised wounds. The second object in the treatment of incised wounds is the removal of foreign bodies. Unless all extraneous substances are removed from a wound, its union will not be effected, and suppuration, abscess, and perhaps sloughing will occur. The third object is to bring the edges of the wound together, and to retain them in such a manner as shall favour their speedy union. Wounds may unite in two ways—either by the establishment of an inflammation, the result of which is the secretion of pus, and the formation of what are called *granulations*, or the throwing out from the wounded parts coagulable lymph, which, becoming organised, unites the edges of the wound together. This latter process is called *union by the first intention*, and should be the great object of the surgeon in treating wounds.

Of the various modes of keeping the edges of wounds in opposition, the application of adhesive plaster is the most common, and certainly applicable to the greater number of ordinary incised wounds. The plaster should be applied in such a manner as to maintain the edges of the wound in contact. There are however some wounds which are too extensive for the use of adhesive plaster, and then the suture is used, which consists in bringing the edges of the wound together by sowing them up.

Wounds however under the best of treatment will not always unite by the first intention; the consequence is, that the parts which do not unite at once will suppurate, and granulations will be formed. This is called *union by the second intention*. When this process takes place, all applications to procure union by the first intention must be abandoned, and all the attention must be given to curing the wound by the process of granulation. Plasters, sutures, and bandages must be removed; and where the inflammation is great, every means should be taken to arrest it. Suppuration should be encouraged by warm fomentations, by poultices, and above all by the warm-water dressing, which consists of nothing more than pledgets of lint dipped in warm water, and then covered over with oiled silk to prevent evaporation and cooling.

Gun-Shot Wounds are treated of in a separate article. [Gun-Shot Wounds.]

WOUVVERMAN, PHILIP, was born at Haarlem in 1620, and received his first instruction in painting from his father. He was instructed also by John Wynants of Haarlem. Wouvverman lived always at Haarlem, and he died there in 1668, aged 48.

Wouvverman's pictures are very valuable and numerous. One or more specimens are in almost every good collection in the northern parts of Europe. Many however of his brother Peter's are attributed to him, but though very similar to Philip's, they are less transparent in colouring, and their horses are very inferior. He had another brother, John, who was a good landscape-painter. John died in 1666, and Peter in 1683.

WRASSE, the English name of a number of beautiful fishes inhabiting the rocky parts of the coast, and belonging to the genus *Labrus* o Linnæus, and family *Labridæ*. They are prickly spined and hard-boned fishes, with oblong scal bodies and a single dorsal fin.

WRAY, ROBERT BATEMAN, an engrave of gems, was a son of the Rev. William Wray vicar of Broadchalk, in Wiltshire, where Rober was born, March 16, 1715. On his father's deat in 1724, the widow and her young family went t reside at Pottern in Wiltshire, where her brothers Edward and Thomas Byng, then lived. Edward Byng was a portrait-painter, who had been a pupi and became an assistant to Sir Godfrey Kneller Under his uncle Wray learnt to draw the huma figure, and acquired a taste for the fine arts. H selected seal-engraving for his profession, and wa placed under a seal-engraver, named Gosset, re siding in Berwick Street, Soho, London, wher his rapid progress excited a degree of jealousy that led to a speedy dissolution of the connection Besides engraving heraldic seals, Wray imitated the productions of the Greek masters, and in a few years his name became extensively known as a gem-engraver, and his productions were sough after with avidity even in Italy. In 1759 he re tired from the metropolis, and took up his residenc in Salisbury, where he produced some of his bes works. Wray died at Salisbury in 1770.

WREN, a name given to many birds, as th Wood-Wren, the Willow-Wren, the Reed-Wren &c.; but the true Wrens form a group of th family *Certhiadæ* [Creeper], and are represente in Europe by that familiar little bird the Commo Wren, *Troglodytes Europæus*, Cuv.; *Motacill Troglodytes*, Linn., *Roytelet* of the French.

The Wren inhabits Northern and Centra Europe; Iceland, Greenland; England, Wales Scotland, and Ireland, Orkney and Shetland Spain, France, and Italy.

This familiar little bird, which has becom sacred, like the Robin, from the confidenc which it shows in courting the neighbourhood o man, creeps about the hedges, making small flights and in its search for insects and worms generally entering the lower part of the hedge and work ing upwards. Like the Robin, it will sing cheerily even in mid winter. The nest is large in propor tion to the bird, and the shape is generally oval the top being in the form of a dome, and the en trance by a small hole at the side. It lays from 7 to 10, and even more eggs.

WREN, SIR CHRISTOPHER, born at Eas Knoyle, Wilts, Oct. 20, 1632, was the son of Dr Christopher Wren, chaplain in ordinary to Charle I., and dean of Windsor. From his father h seems to have inherited a taste for scientific an literary studies, that of architecture included He was entered at Wadham College, Oxford, i his 14th year, and soon distinguished himself i mathematics and natural philosophy. While a Oxford he associated with Hooke, and othe scientific men, whose meetings laid the foundatio of the future Royal Society. In 1653 he wa elected a Fellow of All Souls' College, Oxford In 1657 he was appointed to the professor's cha of astronomy at Gresham College, London, an three years after to that of Savilian professor a

Oxford, when he resigned the Gresham chair. On the establishment of the Royal Society, Wren became a member. In 1661 he was appointed by Charles II. assistant to Sir John Denham, the surveyor-general, and was commissioned in 1663 to survey and report upon St. Paul's Cathedral, with a view to its restoration. Meantime Wren had been employed on the Sheldonian Theatre at Oxford, and Trinity College, Cambridge. He visited Paris in 1665, where the works of the Louvre were then in progress. At the beginning of the following year he returned home, when the great fire of London opened an extensive field for his talents. He made a survey of the whole of the ruins, and proposed a plan for laying out the devastated space in a regular and commodious manner, with wide streets and squares, and a line of spacious quays along the Thames; but this plan was lost sight of altogether in rebuilding the city; and Wren was employed in erecting the Royal Exchange, Custom House (both since destroyed by fire and rebuilt), Temple Bar, the Monument, and several churches, all of which were erected before St. Paul's was begun. In 1672 he received the honour of knighthood; and in 1764 married a daughter of Sir John Coghill, after whose decease he took for his second wife a daughter of Viscount Fitzwilliam, an Irish peer; and by both these ladies he had issue.

During this time he had prepared various designs and models for the intended cathedral; but the one which he himself was most solicitous to see adopted was set aside by the city authorities for that of the present structure. The first stone of the building was laid June 21, 1675; the choir was opened for divine service in December, 1697, and the whole was completed in thirty-five years, the last stone on the summit of the lantern being laid by the architect's son, Christopher, in 1710. It has two transepts, the intersection of the nave and great transept being surmounted by a magnificent dome. The architecture is of the Italian style, based on the Roman. The entire length of the building is 512 feet; breadth of the great transept 283 feet; height of the dome 360 feet; the nave is 170 feet long, 39 broad, and 90 feet high. Wren had resigned the office of Savilian Professor in 1673; he accepted that of President of the Royal Society in 1680, and he also sat several times in parliament, but his numerous and important professional engagements left him little leisure for other pursuits or duties. Enjoying the favour of successive princes, he was employed by Queen Mary to complete the buildings at Greenwich, to be appropriated as a Royal Naval Hospital. He was also employed to make additions to Hampton Court and Windsor Castle.

After the death of Anne, the last of his royal patrons, Wren was dispossessed of his office of surveyor-general, which he had held for 49 years. The last five years of his existence he passed in retirement. He was found dead in his chair after dinner, Feb. 25, 1723. His remains were deposited in the crypt of St. Paul's, and over the entrance to the choir were inscribed the words, 'Si Monumentum quæris, circumspice.'

All Souls' Library at Oxford contains a collection of original drawings by Wren. Among the numerous buildings erected by him besides those already named are St. Mary-le-Bow, Cheapside; St. Stephen's, Walbrook, the interior of which has been recently restored; St. Bride's, Fleet Street; St. Andrews, Holborn; Christ Church, Newgate Street; St. James's, Westminster; the Monument; and Chelsea Hospital.

WREXHAM. [DENBIGHSHIRE.]

WRIETZEN. [BRANDENBURG.]

WRIGHT, JOSEPH, was born in Derby in 1734. He came to London in 1751, and placed himself with Hudson the portrait painter. In 1773 he married, and soon after set out for Italy, where he remained two years. After his return to England in 1775, he resided two years in Bath; he then settled at Derby, where he died in 1797. Wright was a painter of great ability; he drew and coloured well, both in figures and landscape. He practised for many years as a portrait painter, but painted at the same time also a few historical or figure pieces, in some of which he represented the effect of fire-light, a style of work he always had a taste for. His pictures in this style are the best of any which were produced in his own time in England.

WRIT, in its proper signification, means a *writing* under the king's seal, whereby he confers some right or privilege, or commands some act to be done. Writs are either *patent* (open, commonly called Letters Patent, *literæ patentes*), which are not sealed up, but have the great seal attached to them; or close (*literæ clausæ*), which are, or are supposed to be, sealed up. The former are addressed to all persons indiscriminately, generally in these terms—'To all to whom these presents shall come;' the latter are directed to some officer or other individual. Of the former kind is the creation of a peer by patent, which is a royal grant of peerage; of the latter, the creation of a peer by writ, which is a summons to attend the house of peers by the style and title of some barony.

Writ in its ordinary and more limited sense is a term applicable to process in *civil* or *criminal* proceedings. Civil writs are divisible into *original* and *judicial:* original writs issue out of the Court of Chancery, and give authority to the courts in which they are returnable, to proceed with the cause; judicial writs are awarded by the court in which the action is already pending. These are again subdivided into *mesne* and *final*. Original writs (which now, except in the few real actions still preserved, have been superseded by the writ of summons) used to contain a *brief* statement of the plaintiff's alleged cause of action; and such a writ was called in law Latin *breve*, in law French *brief:* and this term was afterwards applied to judicial and other writs. Original writs issued from Chancery were always witnessed, or *tested*, in the name of the king; judicial writs issued from that one of the superior common law courts in which the original writ was made returnable, and were tested in the name of the chief judge of such court. In cases of 50*l.* and under a plaintiff may bring his suit in the county-courts. The suits therein commence by *plaint*, which is

a statement of the party's cause of action in the nature of a *declaration*.

There are many kinds of writs, such as the writ to the sheriff of a county to elect a member or members of the Commons' House of Parliament; the writ of *habeas corpus;* the writ of *subpœna* in Equity; and others.

There is also a writ of error for an alleged mistake in the proceedings of a Court of Record.

In some cases, where judgment goes by default, a writ of inquiry issues to the sheriff, commanding him to summon a jury to inquire what damages the plaintiff has sustained. If the plaintiff offer no evidence before the jury, a verdict must be found for nominal damages, as existence of some damage is admitted. When the *inquisition* (or finding of the jury) is returned, the plaintiff is entitled to judgment for that amount.

WRITER, in Scotland, is a term of nearly the same meaning as attorney in England, and is generally applied to all legal practitioners who do not belong to the bar, although it has of late become customary to substitute for it the term of solicitor. As special exceptions, the body who in Edinburgh enjoy, concurrently with writers to the signet, the privilege of conducting cases before the Court of Session, the Court of Justiciary, &c., are called solicitors of supreme courts (abbreviated S. S. C.), and the practitioners before the sheriff court of Aberdeen are by local custom called advocates.

WRITER TO THE SIGNET, abbreviated W. S., is the designation of the members of the most numerous and important class of attorneys or procurators in Scotland. The writers to the signet enjoy, in common with the solicitors of supreme courts, and with one or two smaller bodies, the privilege of conducting cases before the Court of Session, the Court of Justiciary, and the Commission of Teinds. Their peculiar privilege however is that of preparing the writs which pass the royal signet.

WÜRTEMBERG, a kingdom situated in the south-west of Germany, between 47° 35′ and 49° 35′ N. lat., 8° 15′ and 10° 30′ E. long., is inclosed by Bavaria and Baden with the exception of a small strip of the southern boundary, which is formed by the Lake of Constanz. Its greatest length from S. to N. is about 130 miles; its greatest breadth is 95 miles. The area is 7494 square miles, and the population at the end of 1846 was 1,726,716. The two principalities of Hohenzollern, lately acquired by Prussia, are almost wholly surrounded by Würtemberg.

Würtemberg is for the most part monntainous; on the east the Swabian Alb or Alp enters the country, and the western border is covered by the northern Schwarzwald, both of which send out branches in all directions. The Schwarzwald, which runs from S. to N., slopes gradually towards the central part of Würtemberg. It consists chiefly of granite and sandstone, and is intersected by many well-watered valleys. The highest points of the northern Schwarzwald are the Hornisgrinde, 3640 feet, and the Rossbühl, 2943 feet high. The Dobel is the highest cultivated part of the Schwarzwald. The Swabian Alp is entirely in Würtemberg (excepting a small part of it which is in Hohenzollern), and runs from S. W. to N. E. about 80 or 90 miles, with a mean breadth of about 14 miles, and forms part of the watershed between the Neckar and the Danube. On the north-west side it is steep, but the south-east side gradually declines into undulating hills. Though not so elevated as the Schwarzwald, it is more bleak and barren. There are several large stalactitic caverns in the limestone of the Alp.¶

The principal valleys are those of the Neckar and the Danube. The chief rivers are the Neckar [NECKAR-KREIS] and the DANUBE, into which almost all the other rivers discharge themselves. The Lake of Constanz is the only considerable lake in the kingdom. Small lakes are numerous.

The climate is mild, with the differences however arising from differences of elevation. The summits of the Alp and the Schwarzwald are too cold to produce corn, but are covered with forests and pastures.

Würtemberg is one of the most fruitful countries of Germany, and agriculture is on the whole carried on upon a good system. A manifest improvement in the breed of cattle and horses is remarked at every new cattle-show at Cannstadt, where a fête is held Sept. 26, in each year. The chief agricultural products are spelt, maize, oats, barley, rye, wheat, peas, beans, vetches, potatoes, flax, hemp, rape-seed, poppies, hops, and tobacco. Of the vineyards more than three-fifths are in the circle of the Neckar, the rest are chiefly on the Tauber and the Lake of Constanz; the wines of these last districts are very different from the Neckar wines, rather resembling Rhenish.

The metals and minerals are copper, lead, zinc, iron, marble, millstone-grit, freestone, quartz, precious stones, porcelain earth, potters'-clay, fullers' earth, chalk, salt, and a little coal. The saltworks are the property of government, which has the monopoly of the salt-trade; the annual produce is about 24,000 tons.

The manufactures include linen and woollen cloths, calicoes, silks, lace, hosiery, muslin, carpets, leather, paper, porcelain, earthenware, iron and steel ware, gold and silver plate, tobacco, tobacco-pipes, and gunpowder; there are likewise numerous distilleries and breweries, and chemical factories. Würtemberg has a very considerable trade in its natural productions and manufactures, its horned cattle, horses, sheep, timber, wool, and printed books. The imports consist of raw cotton and cotton manufactures, silks, glass wares, wine, fruit, cheese, china, earthenware, and all kinds of colonial produce. There is likewise a very great transit trade. The inland navigation is important, especially on the Neckar, which becomes navigable at Cannstadt: above 2000 vessels are employed in it. Würtemberg is a member of the German Zollverein. A railway runs N. from Stuttgardt to Heilbronn, and will be joined to the line along the right bank of the Rhine, by a branch now (March, 1851) in course of completion. Another line runs S.E. from Stuttgardt to Ulm, which is completed to Goppingen; from Ulm it runs S. to Friedrichshafen on the lake of Constanz. Ano-

ther line now in course of construction will join Ulm to Augsburg.

The kingdom is divided into four circles, which, with their respective areas and population, are as follows :—

Circles.	Area in sq. m.	Pop. in 1847.
Neckar-Kreis .	1278.5	495,414
Schwarzwald .	1835.4	450,754
Donau-Kreis .	2405.7	404,095
Jaxt	1974.4	376,453
Total . .	7494.0	1,726,716

The revenue of the past year (1850) amounted to about 11,000,000 florins, the expenditure to about 12,000,000. The public debt amounted to 48,762,118 florins on Aug. 3, 1850. In time of peace the army numbers 8020 men; in time of war 19,170. Every man on completing his 20th year is liable to serve for 6 years.

Every parish in Würtemberg has its school. For superior instruction there is a university at Tübingen; there are also, in different parts of the kingdom, seven gymnasia, four lyceums, seventy-eight Latin schools, several evangelical and Roman Catholic normal schools, schools of philology and science, besides schools for the blind and for deaf mutes. According to law, every child must attend school from the age of six years to that of fourteen.

Würtemberg had the sixth place in the German diet, and had four votes in the full council. According to the altered constitution of the German Confederation, agreed to by the plenipotentiaries at the Dresden conference, Jan. 1851, Würtemberg will have one of the eleven votes in the new Directory.

Würtemberg has been a kingdom only since 1806. The reigning family is descended from Count Ulrich, who reigned from 1246 to 1260; and his descendants governed the country with the title of counts or dukes (Eberhard, Ulrich, Christopher, and others), till FREDERICK WILLIAM CHARLES assumed the title of King, Jan. 1, 1806. According to the constitution, which was completed in 1819 under William Frederick Charles, the present king, who succeeded his father in 1816, Würtemberg is an hereditary monarchy with a representative diet consisting of two chambers. Christians of different sects are placed on a footing of perfect equality. The liberty of the press, which had been greatly crippled by a decree of the German Diet in 1819, was established by a royal decree abolishing the censorship, March 1, 1848. In December, 1849, and the spring of 1850, National Assemblies were convoked to revise the constitution of 1819, but in consequence of their democratic leaning they were both dissolved.

WÜRZBURG, the capital of the Bavarian circle of Lower Main, is situated in 49° 45′ N. lat. and 9° 56′ E. long., in a beautiful valley on the Main, over which there is a bridge 200 yards long, adorned with twelve colossal statues of saints. A bishop's see was erected here A.D. 741, and the bishops gradually acquired a large territory, which formed the episcopal principality of Würzburg. The town contains a large number of handsome buildings. The principal churches are :—the Cathedral, which contains many fine paintings, and a long series of monuments of the bishops, each bearing the sword in one hand and the crozier in the other; the church of St. John-im-Haug, built on the model of St. Peter's at Rome; the New Minster, containing the relics of St. Kilian, an Irish missionary, one of the earliest preachers of the gospel in Germany; St. Mary's, an elegant edifice, in the German pointed style, with lofty lancet windows; and the University church (now closed), with the observatory on its lofty tower. The most remarkable of the other buildings are —the splendid episcopal palace, called also the royal residence, though rarely inhabited by the royal family; the Julian Hospital, a very large, wealthy, and admirably-arranged institution; the town-hall; and the University, to which are attached a clinical establishment, and an anatomical museum, a collection of instruments, a library of 100,000 volumes, a cabinet of works of art, &c. The educational, charitable, and useful institutions are very numerous. There are manufactures of various kinds, but none on a very large scale. In the smaller division of the city, on the left bank of the Main, is a steep hill or rock, called the Frauenberg, or Marienberg, about 400 feet high, on which the citadel stands. The view from the citadel is very fine. There are, in the immediate vicinity of the city, 7000 acres of vineyards, and many large gardens. The population of Würzburg is 28,000, besides the garrison. The inhabitants manufacture woollèn cloth, tobacco, leather, hats, surgical instruments, cutlery, paper, sugar, beer, and have a considerable export trade in corn, fruits, and wine. A line of railroad is in course of construction (March, 1851) from Frankfurt-am-Main to Bamberg, which passes through Würzburg.

WYATT, SIR THOMAS, was born at Allington Castle in Kent, in 1503. His father, Sir Henry Wyatt, was one of the executors of Henry VII.'s will, and survived till 1538. Thomas Wyatt entered St. John's College, Cambridge, in 1515. He took his degree of B.A. in 1518, and that of M.A. in 1520. He was then one of the gentlemen of the king's bedchamber in 1525. In 1536 Wyatt was knighted by the king. The remaining part of his life was passed in the toils of diplomacy and anxieties of court intrigue. He died Oct. 11, 1542. Wyatt was one of the most elegant and accomplished courtiers of his age; and a statesman of great sagacity, dexterity, and integrity. Wyatt has left writings both in verse and prose. His verses, if not of much poetical value, show the progressive polish of the language.

WYATT, JAMES, was born in 1746, at Burton Constable, in Staffordshire. He studied architecture at Rome and Venice, and returned to England in 1767. The Pantheon Theatre, in Oxford Street, London, was built by Wyatt, and opened in 1772. It at once gave him celebrity, and he thenceforth became the fashionable architect of the day. He built many mansions in the country, in a sort of Grecian or Greco-Italian style. About

1780 Wyatt began to turn his attention to gothic architecture, which he studied in the original examples. His first essay in that style was Mr. Barrett's residence at Lee near Canterbury (1783), which was for the architect as fortunate in its way as the Pantheon had been, and served to bring the gothic style into vogue for modern residences. From that time Wyatt was extensively employed in altering some of the colleges at Oxford, and also in restoring the cathedrals of Salisbury and Lichfield. He erected Fonthill Abbey for Mr. Beckford. While employed upon it he succeeded Sir W. Chambers, in 1796, as surveyor-general, which led to his being employed at Windsor Castle, by George III. Wyatt died Sept. 5, 1813, in consequence of being overturned in a carriage. His son Benjamin was the architect of Drury Lane Theatre.

WYATVILLE, SIR JEFFRY, nephew to James Wyatt, and son of Joseph Wyatt, was born Aug. 3, 1766, at Burton-upon-Trent, in Staffordshire. He was apprenticed to his uncle, Samuel Wyatt, an architect and builder, in London, and at the end of seven years he served a sort of second apprenticeship with his other uncle James Wyatt, from whom he no doubt imbibed a preference for the gothic style of architecture. In 1799 he entered into business as partner with Mr. John Armstrong, who had extensive building contracts under the government. He was employed extensively as an architect by noblemen and gentlemen in various parts of the country, either in improving and making additions to their mansions or erecting new ones. He was summoned to Windsor by George IV. in 1824, and appointed architect in remodelling Windsor Castle. [WINDSOR.] When the first stone was laid by the king Wyatt obtained the royal authority for altering his name to Wyatville; and on the king's taking possession of the private apartments, in 1828, he received the distinction of knighthood. The execution of the works at Windsor occupied him for the remainder of his life. He resided chiefly at Windsor, within the precincts of the castle, where he died, Feb. 18, 1840. He was buried in St. George's Chapel.

WYCH-HAZEL, the common name of the species of the genus *Hamamelis*, the type of the natural order of plants *Hamamelaceæ*. There are four species belonging to this genus, two of which are inhabitants of North America, one of Persia, and one of China. *H. Virginica*, Virginian Wych-Hazel, is a native of North America from Canada to Florida. In its native districts it attains a height of about 30 feet. This plant is very remarkable from the fact that its flowers appear after its leaves have dropped off. Late in autumn and in winter, when most other plants have lost their flowers and foliage, the Wych-Hazel is covered with a profusion of yellow blossoms, which do not disappear till the commencement of spring.

WYCHERLY, WILLIAM, son of Daniel Wycherly, Esq., of Cleve, in Shropshire, was born about 1640. In his 15th year he was sent to travel in France, where he was induced to become a Roman Catholic. On his return to England, he was sent for a short time to Oxford, where he was reconciled to the Anglican church very soon after which he entered the Middle Temple. Wycherly wrote three or four comedies, of which perhaps the 'Plain Dealer' and the 'Country Wife' are the best. He also published a volume of Poems, which are of no value. Wycherly in his latter years returned to the Roman Catholic faith. He died in 1715.

WYCLIFFE or WICLIF, JOHN DE, is supposed to have been born about 1324, in the parish of Wycliffe, near Richmond in Yorkshire. He was one of the first students admitted at Queen's College, Oxford, which was founded in 1340. He soon however removed to Merton College.

Wycliffe began to distinguish himself by his writings against the Mendicant Orders about 1360, when the contest between the Mendicants and the University was at its height. In 1361 he was made warden of Baliol Hall, and was presented by that society to the rectory of Fillingham, in the diocese of Lincoln. In 1365 Wycliffe resigned the mastership of Baliol for that of Canterbury Hall, then recently founded by Archbishop Islep. In 1368 he exchanged his living of Fillingham for that of Ludgershall, in the archdeaconry of Buckinghamshire. In 1372, having taken his degree of D.D., he read lectures in divinity, in which he exposed the corruptions of the begging friars.

In 1375 he was presented to the prebend of Aust in the collegiate church of Westbury, in the diocese of Worcester, and about the same time to the rectory of Lutterworth in Leicestershire, where he became an edifying preacher. There are about 300 of his parish sermons still extant.

He now began to speak his sentiments very openly on the subject of the pope and the church, in consequence of which he was more than once summoned before convocations of the clergy; but being supported by John of Gaunt, Duke of Lancaster, and Lord Henry Percy, Earl Marshal, he was dismissed without punishment. After the death of Gregory XI. in 1378, the great schism resulting from the election of two popes enfeebled the papal power in England as elsewhere, and Wycliffe was allowed to go on for some years preaching and writing without further disturbance. He also published several works, both in Latin and English, of which by far the most important was his English translation of the whole Bible from the Latin Vulgate. Wycliffe, while he himself remained at Lutterworth or at Oxford, had numbers of disciples whom, under the name of poor priests, he kept travelling over the country, and disseminating his opinions. His doctrines and opinions were occasionally declared by assemblies of divines to be heretical and erroneous, and rigorous measures were taken for their suppression; but Wycliffe himself remained during the greater part of the time unmolested, it is supposed by the influence of the Duke of Lancaster.

Wycliffe spent the latter years of his life at Lutterworth, where his pen was as active as ever. He died in consequence of a paralytic stroke, Dec. 31, 1384. There are Lives of Wycliffe, by

the Rev. John Lewis; by Dr. Vaughan; and by the Rev. Webb Le Bas.

WYCOMBE. [Buckinghamshire.]

WYE. [Severn and Wye.]

WYKEHAM, WILLIAM DE, was born at Wykeham in Hampshire, in 1324. He is said to have been put to school at Winchester by Nicolas Uvedale, governor of Winchester Castle, to whom on leaving school he became secretary, and by him and the bishop of Winchester, he was afterwards introduced to King Edward III., about the year 1348. In 1356 he was made surveyor of the king's works at the castle and in the park at Windsor.

He seems to have taken deacon's orders at an early age; but he was not ordained priest till 1362. Meanwhile he continued to be employed by the king as his head architect, and numerous preferments in the church were bestowed upon him. In 1364 he was made keeper of the privy seal, and soon after he is styled secretary to the king, or what we should now call principal secretary of state. On the death of William de Edyngton in 1366, he was elected by the prior and convent of Winchester as bishop of that see, and was consecrated Oct. 10, 1367, in which year he also became lord high chancellor of England, and held the office till 1371. He was afterwards chiefly occupied in founding two colleges, one at Winchester, which was opened in 1373; and the other, New College, Oxford, for which he had previously purchased the ground, and to which Winchester College was designed as a nursery.

These pious and patriotic exertions were interrupted for a time by a prosecution got up against him in 1376, the last year of the reign of Edward III., by the Duke of Lancaster and his party. Articles were exhibited against him, charging him with various offences committed while he had been keeper of the privy seal and lord chancellor. He was tried before a commission of bishops, peers, and privy councillors, and an order was issued for the sequestration of the revenues of his bishopric; but it was soon deemed expedient to drop the proceedings against him, and his temporalities were restored to him.

As soon as he was released from his troubles he hastened to apply himself anew to the completion of his two colleges [New College; Winchester], and afterwards to the rebuilding the cathedral of Winchester, a structure which still remains a monument of his taste and munificence.

In May, 1389, when Richard II. declared himself to be of age, and removed the Duke of Gloucester and his friends from the council-board, he appointed the Bishop of Winchester chancellor, and he held the office till 1391. Wykeham continued in the discharge of his episcopal duties till within four days of his death, Sept. 27, 1404.

WYMONDHAM. [Norfolk.]

WYNANTS, JAN, was born at Haarlem, about 1600. Little is known about him. He is supposed to have been the master of Wouvverman, to whom some of his pictures have been attributed. He generally painted small pictures, coloured with great transparency: the figures and cattle were painted by several masters,—by Van Thulden, Ostade, Wouvverman, and A. Vandevelde. He was alive in 1677. The date of his death is not known.

WYNDHAM, SIR WILLIAM, the third baronet of that name, distinguished in the parliaments of Queen Anne and the first two Georges, was born in 1687. He was of an ancient family in Somersetshire, and succeeded at an early age to his title and estate. He was educated at Eton and at Christ Church, Oxford, and afterwards travelled for some time abroad. On his return he was chosen to represent his native county in parliament, and married a daughter of the Duke of Somerset. He associated himself with the Tory party, and in 1711 was made secretary-at-war. In 1713 he was promoted to the office of chancellor of the exchequer, and was sworn a privy councillor. In the dissensions between Oxford and Bolingbroke he sided with the latter. He was suspected of favouring the Pretender, and was committed to the Tower, but was discharged without being brought to trial. He opposed Sir Robert Walpole on almost every occasion. Wyndham was an animated speaker. He died at Wells in Somersetshire, July 17, 1740.

WYNTOUN, ANDREW, a rhyming annalist, lived during the early part of the 15th century, and was prior of the monastery of St. Serf's Inch, or Island, on Loch Lomond in Scotland. Nothing has been discovered as to his parentage or the periods of his birth and death, and he is only known as the author of 'The Orygynale Cronykil of Scotland.' There are several MSS. of Wyntoun's Chronicle; the best is that in the Royal Library in the British Museum, from which Mr. David Macpherson edited in 1795 the printed edition in 2 vols. 8vo., which contains an introduction, notes, and a glossary.

WYTTENBACH, DANIEL, was born in 1746, at Bern. His father, Daniel Wyttenbach, died in 1779, being then professor of theology in the university of Marburg. Young Wyttenbach studied philology at Marburg, Göttingen, and Leyden, and in the last place he was one of the pupils of Ruhnken, to whom he became particularly attached. In 1771 he was appointed professor of Greek and philosophy in the Athenæum of Amsterdam, which is now called after him the Wyttenbach Athenæum. From Amsterdam he was transferred, in 1772, to the chair of eloquence in the university of Leyden, of which he and Ruhnken were then the most illustrious scholars. He remained in this office until the infirmities of old age and blindness compelled him to withdraw from his functions. He died at Oegs, Jan. 17, 1820. Wyttenbach was one of the greatest scholars of whom the university of Leyden can boast. His learning was extensive and profound, and he had great critical skill. He always wrote in Latin. One of his best works is the edition of the 'Opera Moralia' of Plutarch, Oxford, 1795–1800, 6 vols. 4to., and 12 vols. 8vo. His smaller essays were collected after his death under the title 'Opuscula varii Argumenti, Oratoria, Historica, Critica,' Leyden, 1821, 2 vols. 8vo.

X to an Englishman is the representative of what might as well be denoted by the two consonants *ks*. But in the Greek alphabet it was merely a guttural aspirate, equivalent probably to the German *ch*. The letter X was the last in the Roman alphabet, neither Y nor Z belonging to it. The words in which those two letters occur are not really part of the Latin language, but borrowed from the Greek, as *zephyrus, zona;* or from some Eastern source, as *gaza*. Such forms as *lachryma, hyems, sylva*, are errors of modern editors. The Romans themselves wrote *lacruma* or *lacrima, hiems* or rather *hiemps*, and *silva*.

The interchanges of *x* with other letters are as follows :—

1. *x* with *c*, as in the double form of the Latin or Greek proposition *ex* or *ec*.

2. *x* with *sc* or *sk*. [See S.]

3. *x* with *g*, as in the Latin *augeo* compared with the Greek *αυξανω*; and *μιγ-νυμι* compared with *mix*, English, and *mix-tus*, Latin.

4. *x* with *ps*, as the Latin *exilis* compared with the Greek *ψιλος*. Thus too *proximus* is the superlative of *prope*. This change is another instance of the interchange of *p* and *c*, so common between Greek and Latin. [See C.]

5. *x* with *z*. Thus in Spanish a *z* is found where the Latin has an *x*. Thus, the Latin words *crux, pax*, have become in Spanish *cruz, paz*.

XALISCO. [Mexico.]

XANTHIAN MARBLES. These interesting marbles form one of the most attractive portions of the collection of antiquities in the British Museum. They consist of a large collection of sepulchral marbles of various ages, which were first made known to the European public by Mr. Fellows (now Sir Charles), who discovered them in 1838. They were all found in or near Xanthus, the ancient capital of Lycia.

XANTHUS. [Lycia.]

XENO'CRATES, a native of Chalcédon, was born B.C. 396. He was originally a pupil of Æschines, the Socratic philosopher, and then of Plato. To Xenocrates is attributed the division of philosophy into Logic, Ethic, and Physic (Physics). He principally occupied himself with attempting to reduce the ideal doctrines of Plato to mathematical elements.

XENO'PHANES was a native of Cólophon in Ionia. Apollodórus fixes his birth about B.C. 620. Though it is not said that he ever resided at Elea (Velia) in Italy, yet this must be assumed, as he is always considered the father of the Eleatic school. He probably lived between the time of Pythagoras and Heraclítus, for he mentions Pythagoras, and is mentioned by Heraclitus. Xenophanes was a poet and a philosopher. He was one of the elegiac poets of Greece, and his philosophical doctrines were expressed in a poetic form. The principal fragments of Xenophanes are collected by Ritter and Preller, 'Historia Philosophiæ,' and were edited by Karsten, Brussels, 8vo.

XE'NOPHON, the son of Gryllus, an Athenian citizen, was a native of the Attic demus Ercheia. The time of his birth is uncertain; but it was probably about B.C. 444; and he lived at least to B.C. 357. Lucian states that he attained the age of above 90. Xenophon became the pupil of Socrates at an early age.

In B.C. 401 Xenophon went to Sardes to Cyrus, the Persian, the brother of Artaxerxes Mnemon, king of Persia. Cyrus had collected a considerable number of Greeks at Sardes, whom he led, together with his own troops, through Asia Minor, Syria, and the sandy tract east of the Euphrates, with the intention of dethroning his brother. The whole of the circumstances are stated in the articles Anabasis and Cyrus *the Younger*.

Xenophon, soon after his return to Greece, was banished by the Athenians. Agesiláus, king of Sparta, was sent with an army into Asia, B.C. 396, and Xenophon was with him during a part at least of this Asiatic expedition. Agesilaus was recalled to Greece B.C. 394, and Xenophon accompanied him on his return ('Anab.', v. 3, 6), and he was with Agesilaus in the battle against his own countrymen at Coroneia, B.C. 394. It was probably after this battle that he settled at Scillus in Eleia, near Olympia, on a spot which the Lacedæmonians gave him; and he sent his sons to Sparta to be educated. From this time Xenophon took no part in public affairs. He resided at Scillus, where he spent his time in hunting, entertaining his friends, and in writing some of his later works. It is said that he was expelled from Scillus by the Eleians, on which he went to Corinth, and probably died there. The sentence of banishment against Xenophon was revoked by the Athenians; but the date of the revocation is uncertain. The Athenians had joined the Spartans against the Thebans before the battle of Mantineia, B.C. 362, and Xenophon sent his two sons, Gryllus and Diodorus, to fight against the Thebans in that battle. Gryllus fell in the engagement. Xenophon probably died a few years after B.C. 359.

The extant works of Xenophon may be distributed into four classes: Historical—the 'Anabasis,' the 'Hellenica,' and the 'Cyropædia,' which however is not strictly historical, and the 'Life of Agesilaus;' Didactic—the 'Hipparchicus,' 'On Horsemanship,' and 'On Hunting;' Political—the 'Republics of Sparta and Athens,' and the 'Revenues of Attica;' Philosophical—the 'Memorabilia of Socrates,' the 'Œconomicus,' the 'Symposium, or Banquet,' the 'Hiero,' and the 'Apology of Socrates.' There are also extant certain letters attributed to Xenophon, but they are not genuine.

The editions of the collected works of Xenophon and of the separate works are very numerous. There are several English translations of the 'Anabasis;' that of Spelman is perhaps best known. The 'Hellenica' were translated by W. Smith, the translator of Thucydides. There are also English translations of the 'Cyropædia,' the

'Horsemanship,' the 'Republic of Athens,' the 'Revenues of Athens,' the 'Memorabilia,' the 'Apology for Socrates,' the 'Symposium, or Banquet,' the 'Hiero,' and the 'Œconomicus,' which is a dialogue on the management of a household and on agriculture, between Socrates and Critobúlus, and is one of the best treatises of Xenophon.

Xenophon appears to have been humane and gentle in character. He liked quiet. He was fond of farming, hunting, and rural occupations generally. He believed in the religion of his country, and was scrupulous in performing and enforcing the observance of the usual ceremonies. His philosophy had reference to actual life, and in all practical matters and everything that concerns the ordinary conduct of human life he shows good sense and honourable feeling. As a writer he deserves the praise of perspicuity and ease, and for these qualities he has in all ages been justly admired.

XEREZ DA LA FRONTERA, a town in Spain, situated in 36° 41′ N. lat., 6° 7′ W. long., near the right bank of the Guadalete, on the high road from Cadiz to Seville, has a population of 31,000. The old town, enclosed within the walls, has narrow and crooked streets; those of the new town, outside, are broad and regular. There are eight parish churches, a college, two free-schools, and six hospitals. The only trade of Xerez is in the wine of the surrounding district, the well-known *Sherry*. The magazines of the wine-merchants are remarkable for their extent.

XERXES I., king of Persia, succeeded his father Darius, the son of Hystaspes, B.C. 485. Xerxes was the eldest son of Darius by his second wife Atossa, and Darius appointed Xerxes his successor.

In the second year after his father's death Xerxes marched against Egypt, which had revolted in the time of Darius. He reduced the country to obedience, and next employed himself four years in making preparations for his Greek expedition. The immense force which was assembled for this purpose was collected from every part of the Persian dominions.

In the autumn of B.C. 481 Xerxes arrived at Sardes, the capital of the Persians in Asia Minor, and he wintered there. In the spring he advanced to the Hellespont with his forces, and crossed at Abýdos by a bridge of boats. The fleet did not enter the Hellespont, but took a western course along the Thracian coast. When the army reached the plain of Doriscus, in Thrace, Xerxes numbered his force. The infantry amounted to 1,700,000 men, the cavalry to 80,000. The war-ships were 1207, and the smaller vessels 3000. The number of men in the war-ships was 277,610; in the smaller vessels 240,000; in all, 517,610. Thus, the whole armament, military and naval, would amount to 2,317,610, including 20,000 men, not before enumerated, camel-drivers and drivers of Libyan chariots. There were, besides, 120 European vessels, containing 20,400 men, and the Thracians, Macedonians, and others, supplied 300,000; increasing the number to 2,637,010. Herodotus considers that all the followers and those in the provision vessels would be more than the fighting men, but we will suppose them to be equal. Thus the sum total is 5,274,010. From Doriscus Xerxes continued his march through Thrace. On reaching the low isthmus which connects the mountain peninsula of Athos with the main-land, the fleet avoided the circumnavigation by passing through a canal which had been cut across the isthmus by order of the Persian king. The army marched through Acanthus, Therme, afterwards Thessalonica (now Saloniki), and thence southward to the pass of Thermópylæ. At Thermopylæ the army was checked for a time by the gallant band of Leónidas. [LEONIDAS.] The mighty naval armament was defeated and dispersed opposite to the island of Salamis, B.C. 480. [SALAMIS; THEMISTOCLES.] Shortly after the battle Xerxes retreated by land to the Hellespont, and crossed over into Asia. He was attended as far as the Hellespont by Artabazus with 60,000 men. Mardonius, who was left in Greece with the army, was defeated in 479, at Platæa in Bœotia by the combined Greeks, and on the same day the Greeks gained another victory over the Persians at Mýcale in Ionia. The Greeks then took Sestos on the Hellespont, B.C. 478.

Xerxes was murdered, B.C. 465, and succeeded by his son Artaxerxes. The great event of the reign of Xerxes is the invasion of Greece with his enormous army and fleet, of which we have in Herodotus (books vii.–ix.) a most minute account. (See Grote's 'History of Greece,' vol. v.)

XIMENEZ, CARDINAL. [CISNEROS.]

XI'PHIAS (ξιφίας), the Sword-Fish, an inhabitant of the Mediterranean and Atlantic, is a fish of the mackerel tribe, remarkable for its elongated upper jaw, which forms a sword-like weapon, measuring from 10 to 15 feet in length. There are well-authenticated instances of the planks of ships being perforated by the jaw of the Sword-Fish.

XIPHOSU'RA, the name by which M. Milne Edwards designates a subclass of crustaceans, which he arranges next to the *Suctorial Crustaceans*.

XYLANDER, GULIELMUS. Xylander's real name was Holzmann (Woodman), which, after the fashion of the scholars of the day, he changed into the equivalent Greek form of Xylander. He was born at Augsburg, December 26, 1532, of poor parents. He was educated at Augsburg, Tübingen, and Basel. His studies were mathematics, and Greek and Latin literature. After the death of J. Micyllus, in 1558, he was made Greek professor at Heidelberg, but he was still very poor and was obliged to add to his means by his pen. He died in February, 1576. Xylander did an extraordinary amount of labour. A large part of his works consists of translations of Greek authors into Latin, among which are his translations of Plutarch, Strabo, Dion Cassius, and the 'Meditations' of Marcus Aurelius. He also translated Polybius and the New Testament into German. These were a part of the labours of this eminent scholar, whose life deserves to be written with more care than it has yet been done.

XYLO'PHAGI (Wood-Eaters), a family of insects of the order *Coleoptera*, section *Tetramera*. The larvæ of these insects burrow into the stems of trees, and are frequently very destructive to valuable timber.

Y has found its way into the alphabets of western Europe through the later Latin alphabet.

The sound of *y*, so familiar to the English at the beginning of words, as in *yes, young, yoke*, was represented in Latin by a mere *i*, which however, when so used, received from the grammarians the distinctive name of *i consonans*. Our modern editors have for the most part substituted for it a *j*. Thus, *iugum*, or rather IVGVM, which is now written *jugum*, commenced with a sound which is commonly held to have been the same with our initial *y* in *yoke*. The English have a habit of expressing the sound, though they do not write the letter, whenever a long *u* begins a word, as *union, unity, useful;* so that those who write *an useful contrivance* insert a letter at the end of the first word which no one would pronounce. In Anglo-Saxon the sound of a *y* was commonly represented by an *e* before *a* or *o*, and by an *i* before *e* or *u*, in which cases the allied languages of Iceland, Denmark, and Sweden for the most part employ a *j*. Thus the Anglo-Saxon writes *eorl, Eotaland, eow, Eadward, eahta, beód-an*, for *earl, Jutland, you, Edward, eight, to bid*. On the other hand, *iett, iúgoth*, represent *yet, youth*. (Rask's 'Grammar.') In several of these words the initial *y* no longer appears in modern English. The sound of *y* again is heard where the French write *ll* or *gn*, as in *vaillant, agneau;* in the Spanish *ll* or *ñ*, as in *Mallorca, Coruña;* in the Portuguese *lh* or *nh*, as in *filho, Minho;* and in the Italian *gl* or *gn*, as in *figlio, agnello*. For the interchange of *y* with *g*, see G; for the use of *z* with the sound of *y*, see Z; lastly, for the connection between the sounds of *j* and *y*, see J and Z.

YAKUTSK. [SIBRIA.]

YAM. [DIOSCOREACEÆ.]

YANG-TSE-KIANG is the Chinese name of one of the largest rivers of Asia. It drains the north-eastern districts of Tibet and the central provinces of China Proper. The source of the river is in the interior of Asia, about 1850 miles from its mouth in a straight line. Its course is generally E., but it frequently makes very large bends; so that its whole length is computed to amount to about 3000 miles.

The head-waters of this river rise between 34° and 35° N. lat., and between 89° and 90° E. long. In its upper course, of about 1300 miles, it receives many considerable rivers. The middle course lies through a hilly country, and is about 900 miles in length. It then enters the great Chinese plain, and passes near many important commercial towns. The lower course of the river is about 800 miles. It flows past Lake Poyang to Nanking, the ancient capital of the Chinese Empire. From Nanking it flows mostly E., and after about 50 miles reaches the Great Canal, and flowing 130 miles more, falls into the Pacific. In all this extent of its lower course the river does not offer any impediment to navigation: its current is gentle. The width varies from a mile to three miles. The tides are perceptible 400 mile from its mouth.

YARD. [STANDARD MEASURES, &c.]

YARMOUTH, or *Great Yarmouth*, a seaport market-town, municipal borough, and parliamentary borough, in Norfolk, is 146 miles N.E. by N from London by the Eastern Counties Railway and 124 miles by the road. Yarmouth is situate on the coast of Norfolk, at the confluence of th Bure with the Breydon Water, which is a lak formed by the confluence of the Yare and Wave ney. The Bure having joined the other two river at the mouth of the Breydon Water, the unite stream, then called the Yare, flows S. and nearl parallel to the shore about 2½ miles, and the turning E. enters the sea, thus forming a penin sula. The town is built on the E. banks of th Bure and the Yare, about half a mile from the sea shore. There is a suspension bridge over th Bure, and a bridge over the Yare connects th suburb of South Town with Yarmouth. Th town consists chiefly of four streets parallel wit the rivers, and connected by alleys called Rows which intersect the streets at right angles. Th Rows are too narrow to be traversed by ordinary wheel carriages, and the traffic of the town i therefore carried on in what are called Yarmouth carts, which are narrow and have very low wheels and look like sledges. The town contains handsome town-hall, a custom-house, a free gram mar-school, a very large parish church, two othe churches, and several places of worship for dis senters. The harbour is in the Yare. There i a bar at the entrance of the river, but vessel drawing 12 feet of water (about 200 tons burthen) can pass it at high water, and sail up to the town The quay is very wide and commodious. Th chief trade of Yarmouth is in fishing for herring and mackerel, and in the curing and exportatio of them. The municipal borough is divided int 6 wards, and is governed by 12 aldermen (o whom one is mayor), and 36 councillors. Th population in 1841 was 24,086. The parliamentary borough returns 2 members. Population 27,550

YARMOUTH. [ISLE OF WIGHT.]

YARN is the general name given to the thread which are woven into the various kinds of textile fabrics, whether cotton, silk, flax, hemp, wool, o worsted; the terms *twist, mule-weft, organzine tram, abb, line*, &c., being particular names applied to particular sorts. [COTTON SPINNING; SPINNING WOOLLEN AND WORSTED MANUFACTURES.]

The exportation of yarn has now become very large, the perfection of English spinning machines enabling foreign weavers to buy ready spun yarn cheaper, in many cases, than they can spin it themselves. The quantities exported and the estimated values, in 1848, were as follows:—

Cotton Yarn .	135,831,162 lbs.	5,927,831*l.*
Linen Yarn .	11,722,182	493,449
Woollen Yarn	8,429,152	776,975
	155,982,496 lbs.	7,198,255*l.*

YAROSLAV (*Jaroslaw*), a government of European Russia, situated between 56° 42′ and 59° N. lat., 37° 45′ and 41° 20′ E. long., is bounded N. by Novogorod and Vologda, E. by Kostroma, S. by Vladimir, and W. by Twer. The area is 13,965 square miles, and the population in 1846 was 1,008,100. The country is a pretty high table-land, diversified by some ridges of low hills and the high banks of the rivers. The soil is a mixture of sand and gray clay, and there are extensive morasses, and some small tracts which are wholly incapable of cultivation. The hills and the banks of the rivers consist of strata of clay, marl, and limestone. The government is drained by the Volga and its feeders; of these the Mologa and the Scheksna are the most considerable. The lakes are 38 in number. The largest is that of Nero, near Rostow, which has an area of 23 square miles. The winter, spring, and autumn are long; the summer short; the air is pure and healthful. Agriculture is the chief occupation of the inhabitants. The soil is only moderately fertile, and the corn produced is far from sufficient for the consumption. Rye, wheat, buckwheat, oats, peas, flax, and hemp, are the common crops. The exports are Russia leather, sailcloth, duck, linen, cordage, some linseed and linseed oil, salt meat in large quantities, and horse-hair; the imports are corn, brandy, salt, iron, and all kinds of colonial produce, drugs, and manufactures.

Jaroslaw, the capital of the government, is situated in 57° 50′ N. lat., 39° 30′ E. long., on the right bank of the Volga, and has about 30,000 inhabitants. It is an open town, surrounded with palisades, but has a citadel which is surrounded by a rampart. The city stands on an elevated plateau, and its many stone houses, its 44 churches, and three monasteries, give it a striking appearance. It is however ill built, with narrow streets, some of which are paved; the principal street by which the town is entered on coming from St. Petersburg is broad, and consists of handsome stone houses. The linen and Russian leather of Jaroslaw are highly esteemed. The trade of the town is very considerable. *Rostow*, situated on the lake of Nero, one of the most ancient towns in Russia, is six miles in circuit. It is surrounded by a rampart and a moat. Besides the bazaar the city contains 200 shops and above 1000 houses, with 6500 inhabitants. The trade is very considerable, and the great fair, which begins at the end of February and continues for a month, is attended by at least 40,000 Russians, Armenians, Greeks, and Tartars.

YARROW. [SELKIRKSHIRE.]

YASSY. [MOLDAVIA.]

YAXLEY. [HUNTINGDONSHIRE.]

YEAR. The year is, roughly speaking, the period of time in which the sun makes the circuit of the heavens, and the seasons of agriculture run through their course.

A *Sidereal Year* is the period in which the sun moves from a star to the same again; that is, the interval between the two times when the sun has the same longitude as a given star. The mean period is 365.2563612 mean solar days, or $365^d\ 6^h\ 9^m\ 9^s.6$.

A *Tropical* or *Civil Year* is the time in which the sun moves from the vernal equinox to the vernal equinox again; and its mean length is 365.2422414 mean solar days, or $365^d\ 5^h\ 48^m\ 49^s.7$.

The *Anomalistic Year* is the time in which the sun moves from its perigee (or nearest point to the earth) to its perigee again; and its length is 365.2595981 mean solar days, or $365^d\ 6^h\ 13^m\ 49^s.3$.

The tropical year is shorter than the sun's actual orbital revolution, or the sidereal year, because the equinox moves slowly backwards, and therefore the sun meets it again before it arrives at the point at which it met it last. The anomalistic year is longer than the sidereal year because the perigee moves forward, and the sun is not nearest to the earth until it has passed the longitude at which it was nearest to the earth before. The *tropical year* is *the* year, when no distinctive term is applied; for the passage of the sun from the southern to the northern side of the ecliptic is the positive phenomenon on which the seasons depend.

The civil year must, for convenience, begin with a day, and contain an exact number of days. But any exact number of days would have the disadvantage of the old Egyptian year, namely, that the seasons would be thrown to all parts of the year in succession.

The Jewish, Christian, and Mohammedan religions all regulate their sacred anniversaries, more or less, by the moon. Various nations have constructed their years on the lunar revolution, though most of them have accommodated their years to the solar year by intercalated months. Now the time between two new moons, that is, the average time, is 29.5305887 days, or about $29\frac{1}{2}$ days. If then months were made alternately of 29 and 30 days, twelve months would contain 354 days, and $11\frac{1}{4}$ days would be necessary to complete the Julian year of $365\frac{1}{4}$ days. This would amount to more than a month in three years. The year contains, over and above twelve lunations, something less than 3 lunations in 8 years; more exactly, something more than 4 lunations in 11 years; still more exactly, something less than 7 lunations in 19 years, which varies little from the truth, whether as to the real, Julian, or even Gregorian year, and is the foundation of the celebrated Metonic Cycle, which, among the Greeks and all who have derived knowledge from them, has always been the foundation of the luni-solar calendar.

The Jews, from the time of their departure from Egypt, began their year with the vernal equinox in all religious reckoning, retaining the old beginning, which was at the autumnal equinox, in all civil affairs. In both cases they reckoned from the new moon near the equinox. By making twelve months in the year, each of 29 or 30 days, with an intercalary month once in three years, they secured themselves from the necessity of any but an occasional alteration. The modern Jewish calendar is regulated by the cycle of nineteen years, and its lunar years contain various adjustments which refer to the religious

ceremonies. Their present usages date from A.D. 338, according to their own account. The Hebrew months, as commonly written in English, are as follows: — Abib (March), Jiar (April), Sivan (May), Thammuz (June), Ab (July), Elul (Aug.), Tisri (Sept.), Bul (Oct.), Chisleu (Nov.), Thebet (Dec.), Sebat (Jan.), Adar (Feb.).

The Roman Calendar, the Julian Year, the Gregorian Calendar, the alteration of the Style, and the Attic Year of the Greeks, are all described under KALENDAR. The French Revolutionary Year is under KALENDAR, REVOLUTIONARY. See also ÆRA and PERIODS OF REVOLUTION.

YEAST, BARM, or FERMENT, a substance which is deposited in an insoluble state during the fermentation of wine, beer, and vegetable juices. This substance, as is well known, is employed to produce fermentation in saccharine solutions. [BREAD; BREWING.]

YEDO. [JAPAN.]

YELLOW FEVER, a disease of frequent occurrence on the eastern and western coasts of America, in the West Indies, in Africa, and in Europe on the southern shores of Spain. Its most common symptoms are yellowness of the skin, partial or general, and, towards the fatal termination, vomiting of a black or dark brown fluid. This disease however has many symptoms in common with other fevers, and it assumes the types of the common, continued, remittent, and intermittent fevers. The Yellow Fever may be said to be peculiar to places between 40° N. lat. and 20° S. lat., and requires a climate in which the mean summer range is not less than 75° or perhaps 80°. In the treatment of Yellow Fever much difference of practice has prevailed, according to the opinions of those called upon to treat the disease.

YELLOW-RIVER, called by the Chinese *Hoang-Ho*, is one of the largest rivers in Asia, and the second in magnitude in the Chinese Empire. It drains the northern provinces of China Proper, a small portion of Mongolia, and the greatest part of Tangut. The Hoang-Ho originates in the high snow-covered mountains which fill up the greatest part of the southern districts of Tangut, a distance of 1290 miles from its mouth in a straight line. Following the course of the river, its length is about 2480 miles.

The chief source of Hoang-Ho is in 35° 20′ N. lat., and 96° E. long. It frequently meets with mountain-ranges in its course, and it is in bending round and between these ranges that the river changes its course so often and to so great an extent. Its upper course for about 700 miles is through the mountain-region of Tangut. Its middle course, from the town of Lant-Tsheou to the spot where it enters the great plain of Northern China, is about 1130 miles. The lower course of the Hoang-Ho begins at the sharp bend where at the confluence of the Wei-Ho it turns suddenly E. The general course of the river is then E. up to its mouth, a distance exceeding 650 miles.

YELLOW SEA. [HOANG-HAI.]

YEMEN. [ARABIA.]

YENESEI. [SIBERIA.]

YENESEISK. [SIBERIA.]

YENIKALE, STRAIT OF. [AZOF.]

YEOMAN, YEOMANRY CAVALRY. C the various derivations proposed for the word ye man, perhaps 'gemein' or 'common' is the mo probable. A yeoman is at the head of the class beneath gentlemen. There is a body-guard calle the yeomen of the king's guard, established b Henry VII. It consists of 100 men habited i the costume of the sixteenth century, and con manded by a captain and other officers. Th vulgar name of Beef-Eaters, by which they ar known, is a corruption of *buffetiers*, from the having been stationed in state banquets at th buffet or sideboard. During the long war conse quent on the French revolution, and whilst th country was threatened with invasion, there wa embodied in almost every county a mounted forc under the name of Yeomanry Cavalry.

Of late years, although many of these yeomanr regiments still exist, they are rather maintaine for the purpose of amusement and good fellowshi than for any practical service.

YEOVIL. [SOMERSETSHIRE.]

YEW. [TAXUS.]

YEZD. [PERSIA.]

YONNE, a department in France, bounded N by Seine-et-Marne and Aube, E. by Aube an Côte-d'Or, S. by Nièvre, and W. by Loiret. It greatest length from N.W. to S.E. is 82 miles its greatest breadth, 53 miles. The area is 281 square miles; and the population in 1846 wa 374,803, which gives 133.2 to the square mil being 40.55 below the average per square mil for the whole of France.

The department has an undulating surface; th highest ground is toward the south-western corne where the hilly district of *Puisaye* separates th basin of the Loire from that of the Seine. Iron-or is obtained; freestone, sandstone, and lithographi stone, are quarried; gun-flints, and red and yello ochre, are procured. A lead mine was formerl worked near Avallon. Roman roads and encamp ments are seen in several districts of the depar ment.

The department is drained chiefly by th Yonne, and its affluents. The Yonne rises in th department of Nièvre, near Château-Chinon; an flows N.N.W. past Coulanges, Auxerre, Joigny and Sens, a few miles below which it turns W and enters the department of Seine-et-Marne where it joins the Seine at Montereau. Its whol course is about 150 miles. The river is navigabl from Auxerre, 64 miles above its mouth. Grea quantities of squared timber and firewood ar floated down the Yonne and its feeders for th supply of Paris.

There are two navigable canals in the depart ment: the Canal de Bourgogne, or Canal de l'Est which connects the river system of the Sein with that of the Rhône [CÔTE-D'OR]; and th Canal-du-Nivernais, which leaves the Loire a Decize, in the department of Nièvre, and enter the Yonne at Auxerre. The department is tra versed by 6 national, 19 departmental, and a grea number of parish roads. It is crossed also by th Paris-Dijon Railway, which passes through Sens Joigny, and Tonnerre.

The area of the department is 1,800,838 acres; of which about 1,150,000 acres are under the plough. The produce in wheat is below the average of the departments; but in other kinds of grain—oats, rye, maslin, and especially in barley—the department far exceeds the average. Other products are hemp, chestnuts, truffles, pulse, and fruits. The vineyards comprehend above 90,000 acres, and the quantity of wine produced is about 19,000,000 gallons annually, two-thirds of which is exported. The wines are known by the general designation of 'Lower Burgundy wines.' The woodlands exceed 360,000 acres. The iron-works are five in number. Besides iron, the manufactures comprise coarse woollens, blankets, serges, casks, conserve of grapes, leather, glass, tiles, and pottery.

The department is divided into 5 arrondissements, which, with their subdivisions and population, are as follows:—

Arronds.	Cantons.	Communes.	Pop. in 1846.
Auxerre . .	12	131	119,057
Avallon . .	5	71	47,576
Joigny . . .	9	108	97,688
Sens	6	90	65,549
Tonnerre . .	5	82	44,933
Total . .	37	482	374,803

Of the arrondissement of Auxerre, and of the whole department, the capital is AUXERRE. *Chablis*, situated in a district famous for its white wines, 12 miles E. from Auxerre, on the left bank of the Serein, has 2603 inhabitants.

In the arrondissement of Avallon the chief town is *Avallon*, which occupies an ancient site on the right bank of the Cousin, a feeder of the Cure, and has tribunals of first instance and of commerce, a college, and 5666 inhabitants. The town, which stands at the opening of a valley, shut in by vine-clad hills, 25 miles S.S.E. from Auxerre, is well built, with wide, clean, and regular streets. The general hospital, the church, and the theatre, are the chief public buildings. Coarse cloth, oak staves, casks, paper, and woollen yarn, are among the industrial products. There is a good trade in corn, wine, timber, wool, horses, and cattle.

Of the arrondissement of Joigny, the chief town *Joigny* is situated on the slope of a hill above the Yonne, 90 miles by railway S.E. from Paris, 17 N.N.W. from Auxerre, and has tribunals of first instance and of commerce, a college, and 6741 inhabitants, including the two suburbs. A handsome stone bridge crosses the river, the right bank of which is lined by a high broad quay, closed at either end by iron gates; an old wall, pierced by 6 gate entrances, surrounds the town on the land side. The streets are for the most part narrow, crooked, and so steep that in some the ascent is facilitated by means of iron hooks fixed into the walls of the houses. The chief industrial products of Joigny are coarse woollen cloth, linen, casks, brandy, vinegar, tiles, and leather; there is an active trade in corn, wine, timber, charcoal, bark, hoops, and conserve of grapes. *Villeneuve*, surnamed *le-Roy* and *Sur-Yonne*, a well-built town, traversed by a wide regular street, terminated at each end by a handsome gate, is prettily situated on the right bank of the Yonne, 11 miles by railway N.W. from Joigny, and has a population of 4525.

The arrondissement of Sens is named from its chief town SENS.

Of the arrondissement of Tonnerre the chief town is *Tonnerre*, which stands in a fertile wine country, on the slope of a hill above the Armançon, near the Canal-de-Bourgogne, 32 miles by railway S.E. from Joigny, and has a tribunal of first instance, an agricultural society, a college, and 4184 inhabitants. The town is old-looking, but the houses are well built of cut stone, and the streets are regular. The magnificent hospital, founded and richly endowed by Marguerite de Bourgogne, sister-in-law of St. Louis, and the church of St.-Pierre, built on a rock above the town, are the most remarkable buildings. Pottery, leather, nails, iron, and paper, are the industrial products of the town and neighbourhood.

The department forms the see of the archbishop of Sens-et-Auxerre; is included in the jurisdiction of the High Court of Paris; and forms a subdivision of the 1st Military Division, of which Paris is head-quarters. Under the late monarchy it returned 5 members to the Chamber of Deputies; it now has 8 representatives in the Legislative Assembly of the Republic.

YORK, the capital of Yorkshire, a city, municipal borough, parliamentary borough, and the see of an archbishop, stands in 53° 58′ N. lat., 1° 4′ W. long., and is 196 miles N.N.W. from London by the road, and 210 miles by the Great Northern Railway, now (March, 1851) completed to Peterborough, and thence through Boston and Lincoln. York is situated near the centre of the county, on both banks of the Ouse, but chiefly in the angle formed by the junction of the small river Foss with the Ouse. The ancient walls are still nearly entire, and there is a public walk on the top of them. The Ouse is crossed by a fine stone bridge of three arches, and there are quays or landing-places below, for the delivery of goods brought up by the barges. The city has still an air of antiquity, but many of the streets have been widened in recent times, and are well paved, and lighted with gas. The most important building is the cathedral, York Minster, which is one of the largest and most magnificent gothic structures in England. The whole length is 524 feet; length of the transept, 222 feet; length of the nave, 261 feet; height of the nave, 93 feet; height of the lantern steeple above the vault, 188 feet. The west front is adorned by two lofty and elegant towers. Besides the cathedral, there are 23 churches and 7 or 8 places of worship for dissenters. The other public buildings are—the Castle, used as a gaol, the mansion-house, guild-hall, house of correction, theatre, county hospital, dispensary, three public lunatic asylums, a free grammar-school, and numerous other schools. The manufactures are not of much importance, but there are three large iron foundries.

York is one of the most ancient cities in the kingdom. The Emperor Septimius Severus made it his place of residence while in England, and both he and Constantius Chlorus died there. It has ever since been the chief city of the northern part of England.

The municipal borough is divided into 6 wards, and is governed by 12 aldermen (one of whom is mayor) and 36 councillors. The population of the city in 1841 was 28,842. The parliamentary borough returns 2 members: population, 30,152.

YORKSHIRE, a maritime county in the northern part of England, and by far the largest of the English counties, is bounded N.E. and E. by the North Sea; S. by the æstuary of the Humber, and by Lincolnshire, Nottinghamshire, and Derbyshire; S.W. by a small part of Cheshire; W. by Lancashire; N.W. by Westmorland; and N. by Durham and the mouth of the river Tees. The greatest length E. to W. is about 100 miles; the greatest width N. to S. is about 92 miles. The county is comprehended between 53° 18′ and 54° 40′ N. lat., and between about 9′ E. long. and 2° 36′ W. long. The area and population are as follows:—

	Area in sq. miles.	Population in 1841.
North Riding . .	2055	204,122
West Riding . .	2576	1,154,101
East Riding . .	1119	194,936
City and Ainsty of the City of York	86	38,321
Total . .	5836	1,591,480

Coast.—From the mouth of the Tees to Flamborough Head the coast of Yorkshire extends E.S.E. and S.E., and is generally high and precipitous. The distance, following the sweep of the coast, is about 60 miles, and the only harbour of importance is that of Whitby. From Flamborough Head, which is a lofty cliff of chalk protruding far into the sea, the coast turns to the W., and sweeping round to the S.S.E. forms Bridlington Bay, in which is the small harbour of Bridlington Quay. The coast then, with a few cliffs at intervals, becomes low to Spurn Point, which terminates on the E. the alluvial district of Holderness.

Surface.—The most striking feature in the conformation of the surface of Yorkshire is the great valley drained by the Ouse and its tributaries—the Ouse and the Trent from Lincolnshire terminating near each other, and forming the great æstuary called the Humber. If through the city of York a line be drawn to the N.N.W. and S.S.E., it will pass along the centre of a wide continuous vale, rarely elevated more than 100 feet above the sea. Were the general level of the land lowered to this extent, this vale would be a sea-channel, bordered by the cliffs of an island on the east, and more slowly rising land on the west. The district on the west assumes a somewhat mountainous character along nearly all the western border of Yorkshire. The eastern region is also mountainous in its northern portion, and in the southern rises into a curved range of hills called the Wolds.

The Wolds consist of an insulated range of chalk hills, which extend in the form of a crescent more than 30 miles, from Flamborough Head almost to the banks of the Humber, about 8 or 10 miles above Hull, separating the basin of the Hull from that of the Derwent. Many feeders of these streams rise on the slope of the Wolds, those of the Hull on the concave side of the crescent, those of the Derwent on the convex side, while the northern part of the Wolds is drained by a stream which falls into the sea at Bridlington Quay.

North of Flamborough Head the basin of the Humber extends to the coast, for the source of the Hartford, a feeder of the Derwent, is as near the shore at Filey Bay as that of the Hull at Bridlington Bay, nor is the head of the Derwent itself more than two or three miles distant from Robin Hood's Bay, which is the north-eastern extremity of the basin.

The oolitic hills which extend from Robin Hood's Bay inland under the designation of the Eastern Moorlands, form part of the northern boundary of the basin of the Ouse and Humber, which they separate from those of the Esk, which falls into the sea at Whitby, and the Tees, which separates Yorkshire from Durham. The Eastern Moorlands are a wild and extensive tract of mountains about 20 miles long and 14 miles wide, the surface of many of the more elevated parts being covered with large freestones and extensive morasses and peat bogs. Some of the mountains are nearly 2000 feet high. A branch of the Eastern Moorlands (the Hambleton Hills and Howardian Hills), extending in a S.E. direction from the western extremity of the range, divides the basin of the Derwent from that of the Swale and the Ouse.

From the western end of the Eastern Moorlands the basin of the Ouse is bounded still on the north side by a lateral branch or offset of the great Pennine chain, which branch separates the basin of the Ouse from those of the Tees and the Eden. The hills which constitute it rise above the valley which separates them from the Eastern Moorlands near Great Smeaton, between Northallerton and Darlington, and extend westward, increasing in height as they proceed to their junction with the main Pennine chain near the mountain called the Nine Standards, in Westmorland. That portion of the range which occupies the N.W. extremity of the West Riding forms the western portion of the wild district of Craven, and comprises, among its more elevated summits, Ingleborough Hill (2361 feet high) and Penyghent (2270 feet high).

The northern part of the western boundary of the basin of the Ouse is formed by the Pennine Mountains, which separate it from the basins of the Eden and of the Lancashire rivers, the Lune, the Ribble, and the Mersey. The branches which the Pennine chain throws off toward the east, and which constitute the Western Moorlands of Yorkshire, are separated from each other by long narrow valleys, in which the Swale, the Ure, the Wharfe, the Aire, the Calder, and the Don, all directly or indirectly tributaries of the Ouse

have their course. The southern end of the Pennine chain forms a part of the boundary between Yorkshire and Derbyshire. The general elevation of the Western Moorlands is greater than that of the Eastern Moorlands, the mountains, as they advance towards the great Pennine ridge, rising to a height approaching 3000 feet.

The valley of the Ouse, or the Vale of York, the eastern and western boundaries of which have been described, commences very near the river Tees, and, occupying the centre of the county, extends S. and S.E. to the Humber. The northern part of this valley has a gentle slope, with the level surface broken by several bold swells; but south of the city of York the surface sinks into a perfect flat, and is in several parts marshy, especially along the course of the Ouse. That portion of the valley which lies immediately about the lower part of the Ouse, and between it and the Wolds which separate the valley from the Holderness district, is called the Levels; and though fertile and pretty thickly inhabited, it is entirely flat. Farther south, towards Sheffield, and on the western side of the valley, the surface is diversified by the hills which gradually rise towards the mountainous district.

Geology.—The great central vale of Yorkshire consists for the most part of great breadths of fine sediments, accumulations of gravel, and other diluvial deposits.

The Wolds consist of chalk, which is usually a harder rock than that of the south of England, and the nodular flints which it contains are scattered through a great part of its thickness. The lower sandstone, shale, and coal, constitute the great mass of the Eastern Moorlands. The coal in this great mass of arenaceous and argillaceous deposits is thick enough to be worked on the moors W. of Whitby and N. of Helmsley. Over the coal is a bed of sandstone, and below is a bed of shale. Upper lias shale, called also alum shale, is manufactured into alum near Whitby, Lofthouse, and Guisborough; it occurs in the cliffs near Whitby. The new red sandstone is found on the western side of the vale of York, in an irregularly undulating tract of dry land, especially about Ripon and Boroughbridge. The magnesian limestone extends in a range of low tabular hills from near Masham, by Knaresborough, Pontefract, Broadsworth, and Roche Abbey. The lower red sandstone, or Pontefract Rock, near Pontefract, is usually a mass of yellowish sands, of the greatest excellence for the use of the metal-founder in the construction of his moulds.

From beneath the southern part of the nearly straight edge of the magnesian deposits rise the sandstones, shales, ironstones, and coal of the West Riding of Yorkshire, and fill an enormous area in the valleys of the Aire, Calder, Went, Dearn, Dove, and Don. The whole of this large area (not less than 600 square miles) yields coal. The whole series of strata is about 4000 feet thick; and of the coal which lies in this series there are about 20 workable beds, yielding about 40 feet of coal, generally of good quality. Ironstones of excellent quality accompany the lower parts of this coal deposit. The seams of coal are worked in the west of Yorkshire as thin as 18 inches (near Halifax and Penistone), and one as thick as 8, 9, or 10 feet (Barnsley), but the average is from 3 to 6 feet.

The millstone grit surrounds the coal-field on the west and north sides from Sheffield, by Huddersfield, Keighley, and Otley, to Harwood. It spreads to the boundary of the county, constituting the mountainous border against Lancashire, and occupies along the confines of Westmorland and Cumberland the summits of all the great ridges about the sources and between the valleys of the Ribble, Wharfe, Nidd, Swale, Greta, and Tees. The millstone grit constitutes most of the high heathy moors of these districts, and contributes much both to their barrenness and their picturesque effect. The most characteristic rock is the quartzose conglomerate, used in making millstones. The whole series is about 1000 feet thick. The mountain limestone, about 1000 feet thick, consists of five principal bands of limestone, alternating with gritstones, shales, thin coals, and some ironstone nodules. It constitutes many of the magnificent mural precipices which surround the great mountains, Ingleborough, Penyghent, Pen Hill, and Micklefell.

Climate.—The great extent of the county of York, and the variety of surface, occasion considerable differences in the climate in various districts. The climate of the coast is, from its situation, cold and bleak, but in some of the vales near it, which are sheltered from the westerly winds and from the sea air, the climate is compatively mild. The Eastern Moorlands and the Western Moorlands are necessarily cold from their exposure and elevation. On the Wolds the cold is less, and the soil is dry and warm.

Rivers.—The greater number of the rivers of Yorkshire are affluents of the Ouse. The Ouse is formed by the confluence of the Swale and the Ure. The Swale rises near the Nine Standards on the border of Westmorland, and the Ure about 10 miles farther S. The two rivers, both of which are rapid, flow in a general E. direction inclining to S., and unite below Boroughbridge. The united stream is then named the Ouse, but more frequently the Ure, or Yore, till it reaches York. The Ouse then flowing S. and E. through the Vale of York, meets the Trent, when the two rivers form the Humber.

The Ure receives the Nidd, a rapid stream, which rises about 10 miles N.W. from Pateley Bridge, and falls into the Ure (or Ouse) about 8 miles above York. The principal affluents of the Ouse are the Wharfe and the Aire. The Wharfe, a very rapid stream, rises a short distance S. from the source of the Nidd, W. of Pateley Bridge, and flowing E. past Weatherby, falls into the Ouse at Cawood. The Aire, a large river, rises not far from Settle, at no great distance from the source of the Ribble of Lancashire, and flowing S.E. and E. joins the Ouse near Howden. The principal affluents of the Aire are the Calder and the Don. The Calder rises not far from Burnley on the borders of Lancashire, and flowing E. to Wakefield, with many windings, joins the Aire near Ferrybridge. The Don is not a rapid river. It rises N.W. from

Sheffield, and passing that town and Rotherham, where it receives the Rother, turns N.E., and flows past Doncaster, joining the Ouse at Goole. The Ouse itself is a slow and somewhat muddy river. Its length from York, following the windings, may be about 35 miles. The total length, from the source of either the Swale or the Ure, is about 130 miles.

The Humber, formed by the union of all these rivers, together with the Trent from Lincolnshire, is a wide æstuary, of the greatest commercial importance. It receives on the N. bank the Derwent and the small river Hull.

Canals.—The canals which intersect Yorkshire are numerous. The Aire and Calder Navigation forms a connection between the Ouse and Humber, the Leeds and Liverpool Canal, the Barnsley Canal, and several other smaller canals. The other principal canals of the West Riding are the Dearn and Dove Canal, the Stainforth and Keadby Canal, and the Huddersfield Canal. In the North Riding and East Riding are the Foss Navigation, the Market Weighton Canal, and a canal from Great Driffield to Hull.

Railways.—A great line of railway extends from Hull through Selby to Leeds, and thence by branches into Lancashire. From Leeds and this main line branches extend S. to all the great manufacturing towns of the West Riding, Halifax, Huddersfield, Sheffield, &c., as well as to Pontefract, Doncaster, &c. From York railways extend N. to Newcastle, &c., with branches to Boroughbridge, Bedale, and Richmond; W. to Harrowgate, whence a line passes through Ripon to Thirsk; N.E. to Scarborough, with a branch to Whitby. A railway from Hull runs N. to the Scarborough line.

Soils and Agriculture.—The soil of the North Riding is generally a brownish clay and loam. The Vale of Cleveland, on the west side of the Eastern Moorlands, has a fine red sandy soil and some fertile clays. Swaledale, on both sides of the Swale, is extremely fertile. The Vale of York, both in soils and fertility, has a great variety. The soils of the West Riding vary from a deep strong clay to the worst peat earth. About 700,000 acres of the West Riding are in pasturage, and about 350,000 arable. In the East Riding the Wolds are chiefly used for sheep pasturage. The soil is a light loam, with a mixture of gravel. The soil of the flat district of Holderness is a strong alluvial deposit. The agriculture is generally of an improved description, but includes almost every variety of practice. The cattle and horses are mostly of superior kinds.

Manufactures.—The manufactures of Yorkshire are of great importance. The manufacture of woollen cloths, at Leeds, Bradford, Halifax, Wakefield, and Huddersfield, has been brought to such a degree of perfection as to compete with the woollens of the West of England. The iron works are very extensive. Sheffield is the great seat of the manufacture of cutlery of all kinds, as well as of tools and plated goods. Linens are extensively manufactured at Barnsley, blanketings at Dewsbury, and glass and iron at Rotherham. Hull, Whitby, and Goole, are the chief ports.

Divisions and Towns.—Yorkshire is divi into the North Riding, the East Riding, the W Riding, and the Ainstey of the City of Y The North Riding is divided into 10 Wapental the East Riding into 5 Wapentakes, including Ainstey of York. The West Riding is divi into 9 Wapentakes. The county is partly in diocese of York and partly in that of Ripon. is in the Northern Circuit, and the assizes held at York. Each Riding returns 2 member parliament, besides which the boroughs of Be ley, Bradford, Halifax, Hull, Knaresboro Leeds, New Malton, Pontefract, Richmond, Rip Scarborough, Sheffield, and York, return eac members; Huddersfield, Northallerton, Thi Whitby, and Wakefield, return each 1 memb total, 37 members.

The following are the principal towns, with population of each in 1841 :—

Askrigg, a small market-town, 57 miles W.N. from York, is situated near the N. bank of Ure. Population of the township, 726.

Barnsley. [BARNSLEY.]

Bawtry, a market-town, 8 miles S.E. from D caster, is a handsome town, and the princi street, which is wide, contains many well-b houses. Population, 1120.

Beverley. [BEVERLEY.]

Bingley, a market-town, 37 miles W.S.W. fr York, is situated on an eminence between river Aire on the S.W. and the Leeds and Liv pool Canal on the N.E., the latter passing close the town. The town consists principally of long street, and contains a parish church, th places of worship for dissenters, and a well-dowed grammar-school. The worsted manufact and cotton-spinning are carried on to a considera extent in the town and neighbourhood. Popu tion of the township, 10,157.

Boroughbridge, a market-town, 17 miles N. from York, is situated on the river Ure, o which there is a bridge. Boroughbridge i chapelry in the parish of Aldborough, and parish-church is at the village of *Aldborough* mile E. from Boroughbridge. Both were par mentary boroughs, and were disfranchised by Reform Act. Boroughbridge has water-commu cation with Hull, and with Leeds, Wakefield, other places, to which it sends corn; and there a branch to it from the York and Newcastle R way. Population, 1024.

Bradford. [BRADFORD.]

Bridlington, 40 miles E. by N. from Yo is situated about a mile from the sea, and consi of one long street and other smaller ones, narr and irregularly built, but lighted with gas. Th was formerly a large priory here, of which th are some remains. The market has been continued. *Bridlington-Quay*, a handsome li town, is situated on the coast, a mile from Br lington, and has a small harbour, with a pier cently erected. Population of the two tow 6070, about half in each.

Dewsbury, a market-town, 35 miles S.W. fr York, is situated on the N. bank of the Cald and has by the Aire and Calder Canal extens water-communication. There are coal-mines

the neighbourhood, and the town has large establishments engaged in the manufacture of blankets, woollen-cloths, carpets, worsted-yarn, iron-founding, &c. The town contains a new court-house, a parish-church, another church, and several places of worship for dissenters. Population of the township, 10,601.

Doncaster, a market-town and municipal borough, 37 miles S. by W. from York, is situated on the S. bank of the Don, and consists of a long, wide, and beautiful main street and several other streets, paved, and lighted with gas. The town contains a handsome mansion-house, guildhall, covered market, theatre, and is the centre of an extensive poor-law union. There is a beautiful ancient parish-church, another church of perpendicular architecture, and several places of worship for dissenters. Railways reach it from the S., N., and W. The race-ground, about a mile from the town, is one of the finest in the kingdom, and races are held annually in September. The municipal borough is divided into 3 wards, and is governed by 6 aldermen (one of whom is mayor) and 18 councillors: population, 10,455.

Great Driffield, a market-town, 30 miles E. by N. from York, is situated in a small stream, one of the sources of the river Hull, which is made navigable to Hull, and the town also adjoins the Hull and Scarborough Railway. There is a handsome corn-exchange, and the market is one of the best in the East Riding. Population of the township, 3000.

Easingwold, a market-town, 13 miles N. by W. from York, is situated in a good grazing district. Population of the township, 2171.

Giggleswick, a neat village, one mile from Settle, deserves notice as containing a superior free grammar-school, founded by Edward VI., and a very ancient parish-church. Population of the township, 748.

Goole, a market-town and port, 30 miles S.W. by W. from Hull, is situated on the S. bank of the Ouse, at the mouth of the Don, and has in recent times become an important harbour, with a considerable inland, foreign, and coasting trade. There are three or four large wet docks, a capacious dry dock, and a patent slip. Ship-building, boat-building, sugar-refining, and iron-founding, are carried on. A canal extends from Goole to Knottingly, near Ferrybridge, 18 miles in length. Population of the township, 2850.

Guisborough, a market-town, 49 miles N. from York, is situated about 6 miles S. from the small harbour of Redcar, at the mouth of the Tees. The alum-works, formerly very profitable here, have declined. The parish church formerly belonged to an abbey, and is very handsome. There is a free grammar-school. Population of the township, 1776.

Halifax. [HALIFAX.]

Harrowgate, celebrated for its mineral springs, and one of the largest watering places in the north of England, 22 miles W. from York, consists of three sections, High Harrowgate, Central Harrowgate, and Low Harrowgate, the chalybeate springs being at High Harrowgate, and the sulphurous and saline springs at the two other places. There are hotels on a large scale, and numerous boarding-houses, reading-rooms, assembly-rooms, billiard-rooms, &c. Harrowgate communicates by railway with York, Leeds, and Thirsk. Population, 3372.

Howden, a market-town, 21 miles S.S.E. from York, is situated about a mile from the N. bank of the Ouse. It is an ancient place, and contains a large and beautiful parish-church, formerly collegiate. Population of the township, 2332.

Huddersfield. [HUDDERSFIELD.]

Hull. [HULL.]

Keighley, a market-town, 30 miles W.S.W. from York, stands in a deep valley at the junction of two streams, which fall into the Aire about a mile to the N.E., where also the Leeds and Liverpool Canal passes. The town is irregularly built mostly of stone, and contains a court-house, and an ancient church. The Leeds and Bradford Railway passes by the town. Population of the parish, 13,413.

Knaresborough, a market-town and parliamentary borough, 19 miles W. by N. from York, is situated on a rocky summit at the foot of which flows the river Nidd. There was formerly a strong castle here, of which there are some remains. There are mineral springs, and a petrifying spring called the Dropping Well, in the neighbourhood. The town contains a parish-church, a chapel of ease, and a free grammar-school. It is a seat of the linen manufacture. Population of the township, 4678. The parliamentary borough returns 2 members: population, 5382.

Leeds. [LEEDS.]

New Malton, a market-town and parliamentary borough, 18 miles N.E. from York, is situated on the N.W. bank of the Derwent. The town is neat, and the large market-place is divided into two parts by the town-hall and the parish-church. Population, 4021. The parliamentary borough returns 2 members: population, 6875.

Northallerton, a market-town and parliamentary borough, 32 miles N.N.W. from York, is situated on the Wiske, an affluent of the Swale, and consists chiefly of one long and wide street. Population of the town, 3000. The parliamentary borough returns one member: population, 4861.

Pateley Bridge, a small market-town, about 30 miles W.N.W. from York, is situated on the S. bank of the Nidd. Population, about 2000.

Pickering, a market-town, 26 miles N.N.E. from York, contains an ancient parish-church. On the brow of a hill at the west end of the town, are the remains of Pickering Castle. Population, about 3000.

Pocklington, a market-town, 13 miles E. from York, is situated on a small affluent of the Derwent, in an agricultural district. Population, 2000.

Pontefract, a market-town, municipal borough, and parliamentary borough, 24 miles S.S.W. from York, is situated on an eminence about 4 miles S.S.E. from the junction of the Calder with the Aire. The streets are spacious and clean, and the town contains a town-hall, free grammar-school, and 2 churches. The remains of Pontefract Castle are on a rocky eminence. The municipal borough is governed by 4 aldermen (one of whom is mayor) and 12 councillors: population,

4669. The parliamentary borough returns 2 members: population, 10,688.

Richmond, a market-town, municipal borough, and parliamentary borough, 44 miles N.W. from York, is beautifully situated on an acclivity on the N. bank of the Swale, over which there is a handsome stone bridge of three arches. The town is well built, and contains a town-hall, a free grammar-school, and 2 ancient parish-churches. In the neighbourhood are the ruins of Richmond Castle, a priory, and two monasteries. The municipal borough is governed by 4 aldermen (one of whom is mayor) and 12 councillors: population, 3992. The parliamentary borough returns 2 members: population, 4300.

Ripon, a market-town, municipal borough, parliamentary borough, and the see of a bishop, 23 miles N.W. by W. from York, is situated near the W. side of the Ure, which is crossed by a handsome bridge. The streets are generally narrow, but are paved and lighted with gas. The town contains a town-hall, theatre, free grammar-school, a small cathedral, and a modern gothic church. The municipal borough is governed by 4 aldermen (one of whom is mayor) and 12 councillors: population, 5461. The parliamentary borough returns 2 members: population, 5927.

Rotherham, a market-town, 6 miles N.E. from Sheffield, is situated at the confluence of the Rother with the Don. Many of the houses are ancient, and there is an ancient parish-church and a free grammar-school. Rotherham has extensive iron-works. Population, 5505.

Scarborough, a market-town, municipal borough, and parliamentary borough, 40 miles N.E. from York, is situated on the shore of the North Sea, and is a favourite bathing-place. The town is built on the declivity of a steep rock, on a projecting eminence of which stand the ruins of Scarborough Castle. There are mineral springs, for the convenient access to which an elegant iron bridge has been thrown across the wide chasm through which the Mill-Beck reaches the sea. The town contains a theatre, public-rooms, and 3 churches. The harbour is little more than the open shore slightly protected by piers. The municipal borough is divided into 2 wards, and is governed by 6 aldermen and 18 councillors: population, 9515. The parliamentary borough returns 2 members: population, 9953.

Sedbergh, a market-town, 77 miles W.N.W. from York, is situated in a secluded vale in a mountainous district. It contains two free grammar-schools. Population, 2268.

Selby, a market-town, 14 miles S. from York, is situated on the W. bank of the Ouse, over which there is a fine timber bridge. The town is mostly well built. The parish-church, formerly conventual, is an elegant and spacious structure. There is a free grammar-school. Trading vessels come to Selby from Hull and London, and fly-boats communicate with Wakefield, Leeds, and other towns. Population of the parish, 5376.

Settle, a market-town, 59 miles W. from York, is situated at the foot of a limestone rock, backed by rugged crags, near the E. bank of the Ribble. Population, about 2000.

Sheffield. [SHEFFIELD.]

Skipton, a market-town, 44 miles W. from York, and the chief town of the mountainous district called Craven, is situated between the Wharfe and Aire in the centre of a good grazing district. It contains an ancient parish-church and a free grammar-school. The Leeds and Liverpool Canal passes by the town. Population, 1000.

Snaith, a small market-town, 23 miles S. by E. from York, stands on an eminence, on the S. bank of the Aire. Population, 1000.

Tadcaster, a market-town, 9 miles S.W. from York, stands on both sides of the Wharfe, which is here crossed by a stone bridge. The parish-church is ancient and handsome. There is a free grammar-school. Population, 1826.

Thirsk, a market-town and parliamentary borough, 23 miles N.W. by N. from York, stands on a small stream in a fertile vale. Population, 3020. The parliamentary borough returns one member: population, 5132.

Thorne, a small market-town, 30 miles S. from York, is situated on the S. bank of the Don. Population of the parish, 3507.

Tickhill, a small market-town, 7 miles S. from Doncaster, is situated in a fertile valley. The ruins of the castle of Tickhill afford evidence of its former size and strength. The parish-church is ancient and handsome. Population, 2000.

Wakefield, a market-town, municipal borough, and parliamentary borough, 29 miles S.W. from York, stands on the N.W. bank of the Calder, at the point where the Barnsley Canal enters it on the opposite side. It is connected by canal with Hull, and by railways with all the chief towns in Yorkshire. The town consists of several spacious and regular streets formed of good houses. The woollen and worsted manufactures, formerly very extensive here, have been to a considerable extent transferred to Halifax and Bradford. The chief manufactures now are iron and brass founding, and the making of steam-engines; malt-making, boat and sloop-building, rope-making, and dyeing. The town contains a large house of correction for the West Riding, the West Riding proprietary school, a free grammar-school, and a fine parish-church of the time of Henry III. There are 3 other churches. The municipal borough is divided into 7 wards, and is governed by 8 aldermen (one of whom is mayor) and 24 councillors. Population, 14,754. The parliamentary borough returns one member: population, 18,486.

Weighton, or *Market Weighton*, a market-town 19 miles S.E. from York, is situated at the W. foot of the Wolds. Population, 1939.

Wetherby, a market-town, 15 miles W. by S. from York, stands on the N. bank of the Wharfe, in an agricultural district. Population, 1433.

Whitby, a market-town, parliamentary borough, and sea-port, 48 miles N.N.E. from York, is situated near the shore of the North Sea, on both banks of the river Esk, which here flows through a narrow valley between lofty and steep cliffs. The river divides the town into two nearly equal parts, that on the N.W. bank being somewhat the largest and best, that on the S.E. the most ancient, with many of the houses rising above each other

among the cliffs. The parish-church, which formerly belonged to Whitby Abbey, stands on the top of the S.E. cliff, and the ascent to it is by 194 stone steps. Adjoining are a few scattered remains of the once celebrated abbey of Whitby. There are 2 other churches in the town. The harbour is in the river, and is provided with quays, and defended by two piers. The western pier extends into the sea in a N.E. direction 1000 feet. The east pier projects across the mouth of the harbour, so as to defend it from the violence of the waves. A bar at the mouth of the harbour prevents large vessels from entering. Population, 7383. The parliamentary borough returns one member: population, 9862.

York. [YORK.]

History and Antiquities.—At the time of the invasion of Britain by C. Julius Cæsar, this part of the island was inhabited by the Brigantes. Yorkshire belonged chiefly to the province of Maxima Cæsariensis.

Traces of Roman encampments are to be seen in several parts of the county; and Roman antiquities have been found in many places, especially in York and its vicinity, and at Boroughbridge and the neighbouring village of Aldborough.

After the termination of the Roman dominion, Yorkshire formed part of the British kingdom of Deira. It afterwards formed a part of the great Saxon kingdom of Northumbria. It was divided in the Saxon times into its three Ridings, then named Trithings.

In the Civil War of Charles I., York and Pontefract sustained protracted sieges, and all the strong castles were successively taken.

Among the more remarkable antiquities of Yorkshire, excepting those of the city of York itself, are the remains of Conisborough Castle, Knaresborough Castle, Pontefract Castle, Skipton Castle, and several others.

The county of York contained about 106 religious houses, of which 14 were abbeys, 44 priories, 7 alien priories, 13 cells, and 28 houses of priors of various orders. Of the above ecclesiastical establishments many ruins yet exist, some of which are very beautiful.

YOUGHALL. [CORK.]

YOUNG, EDWARD, was born in 1684, at Upham, a village in Hampshire. His father was rector of Upham, and finally dean of Salisbury. Young was placed at Winchester College, whence he went to New College, Oxford, Oct. 13, 1703. A few months afterwards he removed to Corpus Christi College, and in 1708 he was nominated to a law fellowship in All Souls' College, where he seems to have devoted himself to poetry in preference to law, and to have adopted those religious principles which he retained through life. In 1714 Young took the degree of B.C.L., and in 1719 that of D.C.L. In 1727 he took orders, and was nominated one of the royal chaplains. In 1730 the college of All Souls presented him with the rectory of Welwyn, in Hertfordshire, where he spent the remainder of his life. In 1731 Young married Lady Elizabeth Lee, widow of Colonel Lee, and daughter of the Earl of Lichfield. By Lady Elizabeth he had a son, Frederic, who was born in 1733, and survived his father. Lady Elizabeth Young died in 1741. Young himself died April 12, 1765.

Young's first poem was published in 1713; his last, 'Resignation,' in 1762. His Satires were published separately, in folio, under the title of 'The Love of Fame the Universal Passion.' They had a very large sale. He wrote three tragedies, 'Busiris,' 'The Revenge,' and 'The Brothers.' The first two were acted with moderate success; the last was unsuccessful. His great work, the 'Night Thoughts,' which has still a large number of readers, was published in London, 1742–6. He also wrote, in prose, 'The Centaur not Fabulous,' 1758, and 'Thoughts on Original Composition,' 1759. In 1762 he published a collected edition of his Works, 4 vols. 12mo.

YOUNG, ARTHUR, was born Sept. 7, 1741, and died April 12, 1820. He was placed in the counting-house of a merchant at Lynn, but he had no liking for mercantile affairs, and he left Lynn, and went to live with his mother, who held a farm. He occupied himself with farming, and a passion for agricultural pursuits and studies soon took possession of his mind. He wrote a very large number of volumes on agriculture, which were of great value at the time when they were published, and have a certain value still.

YOUNG, THOMAS, was born at Milverton in Somersetshire, June 13, 1773, of parents who were Quakers. From the age of 9 to 14 he was with Mr. Thomson, of Compton in Devonshire; and during this period he appears to have learned, besides Greek and Latin, the French, Italian, and Hebrew languages, and to have made some progress in Persian and Arabic. Young was afterwards admitted into the family of a gentleman of Herefordshire, as companion to his son. During some journeys to London, made with the family in which he lived, Young was instructed in chemistry by Dr. Bryan Higgins.

He afterwards decided on adopting the profession of medicine, and studied in London, Edinburgh, and Göttingen, at which last place he took a doctor's degree in 1795. He soon afterwards settled in London as a physician, and he continued to practise till his death.

Dr. Young devoted himself with ardour to the pursuit of natural philosophy in general. In 1794 he was elected a Fellow of the Royal Society, having, in the preceding year, communicated to that body his first paper 'On Vision.' This was followed, in 1800, by a very elaborate paper entitled 'Outlines of Experiments and Observations respecting Sound and Light,' in which he revives the opinion of Hook and Huygens that light consists in the undulations of an etherial medium pervading all matter and space. The subject was resumed in a paper on the 'Theory of Light and Colours;' and subsequently in one entitled 'Experiments and Calculations relating to Physical Optics.' His views are now generally adopted, and have been much enlarged. In 1807 Dr. Young published his 'Lectures on Natural Philosophy,' in 2 vols. 4to. This work contains a very large quantity of research.

In 1814, having had an opportunity of examin-

ing the writing on some fragments of papyrus brought from Egypt, Dr. Young was led to examine the triple inscription on the Rosetta Stone; and in November of that year he communicated to the Society of Antiquaries his 'Conjectural Translation of the Inscription, derived from the Egyptian Texts.' He first proposed the idea that the Egyptians used occasionally hieroglyphical signs as alphabetical characters on their monuments, in order to express the names of Greek and Roman sovereigns who had ruled over their country; an idea from which M. Champollion deduced a phonetic alphabet, applicable not only to the names and titles of foreign sovereigns, but also to those of the native sovereigns, and the divinities of ancient Egypt.

In 1818 Dr. Young was appointed secretary of the Board of Longitude; and, on the dissolution of that body, he became sole conductor of the 'Nautical Almanac.' He died May 10, 1829.

YPRES. [Flanders, West.]

YRIARTE, TOMAS DE, nephew of Juan de Yriarte, librarian of the Royal Library, Madrid, was born about 1750. Under the direction of his uncle he made rapid progress in the ancient and modern languages. The approbation which some essays he wrote met with procured for him the editorship of the 'Madrid Mercury,' which became in his hands a useful and amusing publication. In 1769 a new theatre was opened in Madrid, and Yriarte translated for it a number of French dramas. In 1778 his comedy of 'El Señorito Mimado' (the Spoiled Child), was favourably received. In 1779 he published a poem in five books, entitled 'La Musica:' it is upon this work and his Fables that his reputation chiefly rests. He died Sept. 17, 1791.

YSSENGEAUX. [Loire, Haute.]

YTTRIUM, a peculiar metal discovered by Gadolin in 1794, in the state of oxide, which is named *Yttria*. It exists in the minerals *gadolinite*, *tankelite*, *yttrocerite*, *yttrocolumbite*, and some others.

Yttrium presents the aspect of small brilliant scales, having a perfect metallic lustre. After being washed and dried, it is a brilliant blackish gray powder, composed of small metallic scales. It does not oxidise either by the action of air or water, at common temperatures; but when heated to redness in the air, it takes fire, burns with much splendour, and is converted into yttria. Yttrium dissolves in diluted acids, with the evolution of hydrogen; when immersed into a solution of potash, it decomposes water, and oxidises, though not with rapidity.

Oxide of Yttrium, or *Yttria*, is colourless, insipid, insoluble in water, and infusible; its specific gravity is 4.842; it is perfectly insoluble in the caustic alkalies. It has no action on vegetable colours. It consists of $Y^1 O^1$.

YUCATA'N, a republic in Central America, lies between 17° and 21° 30′ N. lat., and between 86° 35′ and 91° 12′ W. long. It extends N. to S. about 250 miles, and E. to W. 180 miles. The area is about 45,000 square miles. It is bounded W. and N. by the Gulf of Mexico, E. by the Gulf of Honduras, S.E. by the English settlement of Honduras, or Balize, S. by Guatemala, and S.W. by the Mexican states of Chiapa and Tabasco. The population is about 600,000.

The northern part of Yucatán is without rivers, rivulets, or springs, owing to the absorbent nature of the soil; but there are wells in abundance. The surface of this region is a level plain, slightly undulating. The soil is of moderate fertility, and produces, by means of irrigation, nearly all the grains, fruits, and plants which are cultivated in the West Indies; but on account of the difficulty of irrigating, very large tracts are left waste. The southern part of Yucatán is a dead level, and the soil is alluvial. As the rivers which traverse it are much swollen during the rainy season, the greater part of the plain is inundated for several months of the year. The productions are maize, plantains, yams, cocoa, sugar, vanilla, and indigo. The woods consist of large trees, among which the logwood-tree is very abundant. The population consists of the descendants of Spaniards and a nation of aborigines called the Mayas. Though the whites are the chief landed proprietors, the majority of the Mayas are possessed of small tracts of land. The Mayas, however, constitute the working class, either as agricultural labourers, menial servants, or mechanics. Yucatán is divided into 5 departments and 18 districts. *Merida*, the capital, is 36 miles S.E. from its port Sisal. It is the seat of the government of the republic. There are five squares, the principal of which is in the centre of the town, and is surrounded by the cathedral, the bishop's palace, government-house, and the dwellings of the wealthiest citizens. The population is stated to exceed 28,000, the majority of whom are Indians and half-breeds. *Valladolid* is a considerable town in the interior, with more than 15,000 inhabitants. *Campeachy*, on the Gulf of Mexico, is entirely built of limestone. The streets are narrow and irregular. It exports large quantities of logwood, wax, and honey.

Yucatán was discovered in 1517 by Hernandez Cordova. When Cortes had subjected Mexico to the dominion of Spain, he sent, in 1522, Bernal Diaz to conquer Yucatán, which he accomplished. Yucatán remained under the sway of Spain up to the time when the Mexican States acquired their independence. In 1835 the federal government in Mexico was changed into a central government. This excited much discontent in Yucatán, and led to a declaration of independence in 1839, which, after two years' contest with Mexico, was confirmed. The legislature consists of a senate and a house of representatives, and a governor is at the head of the executive.

YUCCA, a genus of plants belonging to the section *Asparageæ*, of the natural order *Liliaceæ*. *Y. gloriosa*, Common Adam's-Needle grows on the shores of the Carolina, where its panicle of elegant flowers attains a height of 10 or 12 feet. *Y. filamentosa*, Thready Adam's-Needle, is found on the shores of Virginia and the Carolinas.

YVERDUN. [Vaud.]

YVETOT. [Seine-Infe'rieure.]

YVIZA. [Balearic Islands.]

Z, like Y, was only found in the later Roman alphabet [see X], from which it has been transferred to the alphabets of western Europe. In the Greek series of letters it occupied, the seventh place, the sixth being the property of the subsequently disused Vau or F. The permutations to which Z is liable have partly been spoken of above, and all of them anticipated in the other letters. [See D; G; I; J; S; T; Y.]

ZAANDAM. [Holland.]

ZACATECAS. [Mexico.]

ZACHARIAS. [Zechariah.]

ZAIRE, the largest river in Western Africa S. of the equator, is commonly called the *Congo*. Nothing certain is known of its upper course. It has only been traced to the distance of 280 miles from its mouth. It is there from two to three miles wide, and is shallow. It afterwards contracts, falls over ledges of rock, and below Lemboo Point, to which the tide ascends, becomes navigable, but is divided into two or three channels. Near 13° 20′ E. long. the whole body of water is united in one channel, a mile wide; and it becomes deep and rapid by the time it reaches the sea at Fathomless Point.

ZAMBISI. [Senna.]

ZA'MORA, a town of Spain, situated on the right bank of the Duero, 110 miles N.W. from Madrid, has about 10,000 inhabitants. The town is separated from its suburbs by walls, in which there are eight gates. The streets are narrow, the houses lofty, and the general aspect of the town sombre. The churches and the town-house are the finest buildings.

ZAMPIERI. [Domenichino.]

ZANGUEBAR, a country situated on the E. coast of Africa. The mouth of the river Mozimba (11° 50′ S. lat.) is considered its southern limit, and Ras Assoad (4° 10′ N. lat.) its northern limit. The extent of the coast-line exceeds 1500 miles; and this coast is all that we are acquainted with.

In the most northern portion from Ras Assoad to the mouth of the river Juba (a few miles south of the equator) there are several towns, with from 1000 to 4000 inhabitants. Most of these towns are built on rocky promontories. The country south of the river Juba contains numerous fine harbours, the most frequented of which is Magadoxo. [Magadoxo.] The shore is formed of coral rock, and there are many coral islands and reefs. At the southern extremity of this region (near 2° S. lat.) begins a low coast-line, which contains several excellent harbours, the best known of which are Melinda and Mombas. [Mombaça.] The year, in these regions, is divided between the dry and rainy season. The heat in summer is very great. The productions are rice, millet, beans, peas, and sugar.

Zanguebar is partly subject to native princes, and partly to the Imaum of Muskat. The inhabitants are either tribes of African origin or settlers from other parts of the world. The commerce of Zanguebar is limited to Arabia and Hindustan. The exports to Arabia are rice, sugar, molasses, ivory, and gums. The chief imports are dates, arms, and some manufactured goods of India.

Vasco de Gama, on his passage to India, sailed along this coast as far north as Melinda. After the conquest of Mozambique the Portuguese began by degrees to extend their conquests farther north. In 1528 they took Mombas, but after that time they gradually relaxed in their efforts to subject the country, and towards the end of the 16th century they left it.

ZANTE. [Ionian Islands.]

ZARA. [Dalmatia.]

ZEA (the ancient *Ceos*) an island in the Ægean, about 13 miles S.E. of Cape Colonna. The island is 14 miles long from N. to S., and 10 broad from E. to W. The capital, *Zea*, is situated in about 37° 38′ N. lat., 24° 20′ E. long., on the northern declivity of Mount St. Elias. The whole island has a population of about 5000.

ZEA, a genus of plants belonging to the natural order *Gramineæ*. It is entirely American. *Z. Mays*, Common Maize, or Indian Corn, is largely cultivated in America, as well as in most countries of southern Europe. [Maize.]

ZEALAND, a province of the Netherlands, situated between 51° 14′ and 51° 45′ N. lat., 3° 13′ and 4° 7′ E. long., is formed of the ancient province of Zealand, of the tract called Dutch Flanders, and of a group of islands formed by the several arms of the Schelde. It is bounded N. by branches of the Schelde, which separate it from the islands of Overflacke and Goeree, E. by the provinces of North Brabant and Antwerp, S. by Flanders, and W. by the German Ocean. Its area is 670 square miles, and the population in 1849 was 160,297. The surface is only a few feet higher than the sea. The soil is a rich black mould, and very fertile. The climate is damp and variable. The chief means of subsistence are agriculture, the breeding of cattle, and the fisheries. There are manufactures of linen, woollen, and fine yarn; distilleries, breweries, salt-works, and dockyards for ship-building. The following are the principal of the islands:—

Walcheren, in which are the towns of *Middelburg*, the capital of the province, a seaport and fortified town, connected with the West Schelde by a navigable canal half a league in length; population 15,000; and Flushing.

Beveland, North and South. *Schouwen*, separated by the East Schelde from North Beveland. In this island is the town of *Zierickzee*, with 7000 inhabitants, who derive their subsistence from the fishery, salt-works, trade in madder, &c. *Duiveland*, separated from Schouwen by the Dyl. *Tholen* island produces the finest flax, and it manufactures the finest thread. *Cadsand*, on the island of Cadsand (which is 5 leagues in length and 4 in breadth, has rich pastures, and is famous for its cheese), is a mere village.

ZEALAND, NEW, one of the British colonies, consists of a group of islands situated in the Pacific,

and in the southern hemisphere. This group includes two large islands and a small island S. of them. Several islands still smaller are scattered along the shores. The northern of the two large islands is called by the natives Eaheinomauwe, and the southern Tavai-Poenammoo; they are separated by a wide strait, called, from its discoverer, Cook's Strait. The northern island is called by the colonists New Ulster, or North Island; the central large island is called New Munster, or Middle Island, and sometimes South Island; and the small island is New Leinster, or Stewart Island. The islands lie between 166° and 178° 35′ E. long., and between 34° 25′ and 47° 20′ S. lat. The entire length of the two large islands is about 1200 miles, the mean breadth about 140 miles. The area is about 95,000 square miles. Stewart Island is about 60 miles long, and 60 miles wide. The native population in 1848 was estimated at 120,000; the Europeans at 20,000.

New Ulster is of a very irregular shape, extending N.E. and then N.W. New Munster extends in a direction nearly N.W. A chain of lofty snow-clad mountains extends through the whole of the central part of New Munster, and through the S.E. end of New Ulster. The islands are of volcanic formation, and consist of sandstones and shales. Mount Egmont, an extinct volcano, on the W. side of New Ulster, has an elevation of 8840 feet. Tongarero, in the centre of the same island, an active volcano, has an elevation of 6200 feet. In New Munster is Mount Arthur, 8000 feet high. Copper, manganese, and coal, have been found. The soil on the table-lands, in the valleys, and near the coasts, is generally fertile, and the surface is well wooded. The sides of the mountains are generally bare of wood, but overgrown with ferns and grasses. The largest river in New Ulster is the Waikato, which flows N., and falls into the sea on the W. coast, forming Waikato Harbour. Knowsley River forms a bay at the south end of New Munster. Small rivers and springs are abundant in both islands. There are three large lakes in New Munster, one in New Ulster, and several smaller lakes. The temperature ranges from 39° to 74° Fahr. The mean temperature of the year is about 58° Fahr. The mean annual rain is from 36 to 40 inches. Snow rarely falls, but heavy rains and high gales are frequent. The flax-plant (*Phormium tenax*), an edible fern (*Pteris esculenta*), the sweet potato, and a variety of timber-trees, are the chief vegetable productions. Wheat, maize, and other grains and vegetables have been introduced by the colonists, and the grazing grounds afford pasture all the year round.

The natives of New Zealand call themselves Maori. They are generally tall, muscular, and well proportioned, and do not vary in size so much as Europeans do. A large proportion of the Maories are males capable of bearing arms, and they are now generally armed with guns, and are skilful in the use of them. They were originally cannibals, but the greater part of them have now been converted to Christianity. There are about 40 missionary establishments.

The colonists are located at about nine principal settlements, besides smaller dependencies on these. These settlements are scattered over a distance of about 800 miles, separated from each other by wide intervals, and communication by land occurs only between three or four of them. The settlers are chiefly British subjects, but there are among them many Americans, French, and Germans.

The principal British settlements are *Auckland*, the capital, on the N.W. coast of New Ulster, at the head of Waitimata Bay, with a population of about 3000; *New Plymouth*, on the west coast of New Ulster, 150 miles S. by W. from Auckland, with a population of about 2000; *Petre*, on the river Wanganui, 60 miles S.E. from New Plymouth; *Wellington*, in Cook's Strait, at the S. extremity of New Ulster, and on the west side of Port Nicholson; *Nelson*, at the N. end of New Munster, in Tasman Bay, with a population of about 3000; and *Dun Edin*, on the shore of Otago Bay, on the S.E. side of New Munster, 320 miles S.S.W. from Port Nicholson, with a rapidly increasing population and trade. *Canterbury* is another of the recent settlements at the southern end of New Munster. British produce and manufactures to the value of 106,334*l.* were exported to New Zealand in 1849. The government of the colony is vested in a governor and council. New Zealand is also the see of a bishop.

The islands were discovered by Tasman, and were visited by Cook and Vancouver. The first settlements were made by whalers and others from Australia. The Church Missionary Society commenced its labours in New Zealand in 1814, and were followed by the Wesleyans and the Roman Catholics. The New Zealand Company sent out the first regular colony in 1839, and the first settlements were made on the shores of Cook's Strait. In 1840 the British government established the colony, and made Auckland the seat of government.

ZEBRA. [Horse.]

ZECHARI'AH, or ZACHARI'AS, the son of Berechiah, the son of Iddo, was one of the twelve minor Hebrew prophets. He was contemporary with Haggai, and prophesied at the time of the rebuilding of the Temple at Jerusalem.

ZEITZ. [Merseburg.]

ZELL. [Lüneburg.]

ZEMBLA, NOVA. [Nova Zembla.]

ZEMINDAR, a Persian word which signifies literally a landholder. In Hindustan a number of villages form a district, which is larger or smaller according to the number and extent of the villages: the head man of such a district is called a *Zemindar*, and the district itself a *Zemindari*. The chief business of the zemindar is to collect the revenues of his district for the government. The cultivators of the soil, who pay rent out of the produce of their land to a sovereign proprietor, are called *Ryots*.

ZEND-AVESTA. [Zoroaster.]

ZENITH and NADIR are two Arabic terms, imported into Europe with astronomy, to signify the point of the heavens immediately above the spectator, and the opposite (invisible) point below him. The latter term, though still mentioned in books

on the use of the globes, is quite obsolete among astronomers; the former is very frequently employed.

ZENO of Citium, a small town in the island of Cyprus, was the founder of the sect of the Stoics. He was a contemporary of Antigonus Gonatas, king of Macedonia, and died before him. Antigonus Gonatas died B.C. 240. Clinton places the birth of Zeno between B.C. 357 and 352, and his death either in B.C. 263, or in B.C. 250 according to Diogenes Laertius. His father was a merchant, and Zeno when young followed his father's business. It is not certain what his age was when he came to Athens. He taught at Athens for 58 years, and he lived to the age of 92, or, according to other accounts, to the age of 98. Zeno is said to have successively attended Crates the cynic, and Stilpo and Diogenes Cronus, who belonged to the Megaric school, and ultimately to have come over to the Academic school, when Polemo was the head of it. Zeno's pupils assembled in the painted colonnade (stoa) at Athens, whence they received the name of *Stoics* (Stoici).

The name of Zeno is more conspicuous as the founder of a school which continued for several centuries, than for what he did himself, though his writings were numerous. A list of them is given by Diogenes Laertius. Very few fragments of them remain. It is probable that the stoical doctrines, as exhibited in the opinions and writings of his followers, cannot be considered to have been elaborated by Zeno, though, according to all testimony, he laid the foundation of that which was developed and extended by others. His successors in the Stoic school were as follow:—Cleanthes, Chrysippus, Zeno of Tarsus, Diogenes of Babylon, Antipater of Tarsus, Panætius of Rhodes, and Posidonius. According to Clinton, Posidonius came to Rome B.C. 51. Panætius was the friend of Scipio Africanus the Younger, Lælius, and other distinguished Romans, and he introduced the stoical philosophy at Rome. The stoical doctrines suited in many respects the Roman character, especially in the modified form in which they received them. The most illustrious of the Romans who may be considered as a Stoic was the Emperor Marcus Aurelius.

The Stoics made three divisions of philosophy, which Plutarch calls the Physical, Ethical, and Logical (λογικόν), of which our word Logical is not a translation. But other Stoics made different divisions. Their system, so far as we can learn what it was, was obscure, and they were certainly not well agreed among themselves on their metaphysical doctrines. They cultivated logic, rhetoric, and grammar. In their Physical doctrines they assumed two first principles, the Active and the Passive: the Passive was Matter (οὐσία), the first substance of which all things were made; the Active was God, who was one, though called by many names. Their Ethical doctrines have attracted most attention, as exhibited in the lives of distinguished Greeks and Romans. To live according to nature was the basis of their ethical system; but by this it was not meant that a man should follow his own particular nature; he must make his life conformable to the nature of the whole of things. This principle is the foundation of all morality, and is indisputable, but its application is not always easy, nor did they all agree in their exposition of it. They held that the only good things were virtue, wisdom, justice, and temperance, and the like; that the truly wise man is sufficient in himself; despises all that subjects to its power the rest of mankind; feels pain, but is not conquered by it.

The Stoics, or the so-called Stoics, formed a sect that continued for four centuries. Most of the works of the stoical writers are lost. Two of them, whose works remain, Epictetus and the Emperor Marcus Aurelius, if not the most genuine specimens of the Stoic school, are certainly two of the most worthy.

ZENO, Emperor of the East, succeeded, in A.D. 474, the Emperor Leo I. Thrax, or more correctly his own son Leo II., the younger. He was the son of a noble Isaurian, and his original name was probably Trascalisseus. In A.D. 468 the Emperor Leo Thrax gave him his daughter Ariadne in marriage, and he adopted the Greek name of Zeno. He was also created Patricius, and appointed commander of the imperial life-guard and commander-in-chief of the Greek army in Asia Minor.

Leo chose Leo, the son of Zeno and Ariadne, for his successor, in A.D. 473. The Emperor Leo Thrax died early in the following year, A.D. 474, and Leo the younger succeeded him under the regency of his father. Zeno succeeded in gaining the affections of the people in some degree, and he found no resistance when he contrived to be proclaimed Emperor. His son, the young Emperor Leo, put the imperial diadem on his head; but although Zeno became Emperor, he was only the second in rank, as we may see in the laws issued by the two emperors, where Leo's name is always put before the name of his father; on some coins however the name Zeno stands before Leo. Leo died towards the end of the same year, A.D. 474.

Zeno was scarcely established on the throne when he lost it by a rebellion of Basiliscus, the brother of the Empress-dowager Verina, both of whom conspired against the new Emperor when they saw that their influence was checked by the increasing power of the brothers and other Isaurian friends of Zeno. The rebellion broke out so suddenly (A.D. 475) that Zeno fled to Isauria without making any resistance, and Basiliscus was proclaimed emperor. But this usurpation did not last long. Zeno besieged Basiliscus in Constantinople; the city was taken by surprise, and Basiliscus was made prisoner, and starved to death in a tower in Cappadocia. Zeno was re-established, but the rest of his life was disturbed by troubles and rebellion. During this reign Theodoric the Goth conquered Italy. Zeno died in April A.D. 491.

ZENO'BIA, SEPTI'MIA, was the daughter of Amrou, an Arab chief, who possessed the southern part of Mesopotamia. Her second husband was Septimius Odenáthus, of Palmyra, a flourishing city included within the limits of the Roman Empire, and dignified with the title of Metrópolis Colonia. He was at the head of some tribes who belonged to that part of the Syrian desert which surrounds Palmyra. In A.D. 251 Septimius

Airanes was prince of Palmyra, and his son Odenathus was general. On the death of Airanes Odenathus succeeded to the principality of Palmyra. Odenathus afterwards assumed the kingly title, and it is probable that he was considered Emperor in the East. Probably about A.D. 263 Odenathus was associated by Gallienus in the empire, and received the title of Augustus. Odenathus was assassinated at Emesa in Syria with his son Orodes, A.D. 267. The conspirators were put to death by the soldiers of Odenathus, and his wife Zenobia succeeded to his power.

Zenobia, after the death of her husband, governed Palmyra till she was taken prisoner by Aurelian. Her power extended from the Euphrates to the Mediterranean and the borders of Egypt. Palmyra, in the Syrian desert, was her residence, a city then the centre of a great commerce. [PALMYRA.] Zenobia maintained herself against Gallienus, and also during the reign of his successor Claudius, who was occupied with his Gothic wars, but the accession of Aurelian (A.D. 270) once more placed a soldier at the head of the empire. Zenobia was defeated by Aurelian, Palmyra was taken, and the Syrian queen appeared at Rome in chains in the triumph of the Emperor. [AURELIAN.]

The habits and person of this warrior queen are described by Trebellius Pollio. She lived in great state. When she harangued her soldiers she wore a helmet: her dress had a purple border with jewels hanging from the fringe; her vest was fastened round the waist with a clasp, and her arms were sometimes bare. Her complexion was rather dark. Besides Syriac she was well acquainted with Greek and Egyptian. Her Greek secretary was Longinus. [LONGINUS.]

ZEOLITES, a class of earthy minerals, to which the term was originally applied by Cronstedt on account of their boiling and swelling when heated by the blowpipe, from ζέω, *to boil*. Dr. Thomson describes the chemical constitution of zeolites as *double hydrous aluminous silicates*. The number of them is considerable. Among them are *Agalmatolite* and APOPHYLLITE.

ZEPHANI'AH, or SOPHONI'AS, one of the twelve minor Hebrew prophets, prophesied in the reign of Josiah, king of Judah, from the year B.C. 630 to 624. Zephaniah was contemporary with Jeremiah during the first part of that prophet's ministry.

ZEUXIS, one of the most celebrated painters of antiquity, and the greatest of his time, was born at one of the ancient cities named Heraclea (it is uncertain which), between B.C. 460 and B.C. 450. He seems to have repaired early to Athens, and was at the height of his fame during the reign of Archelaus, king of Macedon, with whom he was intimate; he lived also some time at Ephesus. Lucian terms Zeuxis the greatest painter of his time: he was immediately preceded by Apollodorus of Athens, and was followed by Parrhasius of Ephesus. The time and place of the death of Zeuxis are unknown; he died probably some years before the second year of the 102d Olympiad (B.C. 355).

ZINC. This metal, in commerce frequently called *Spelter*, does not occur in the native state, but is obtained from its ores, which are chiefly the sulphuret and carbonate of zinc. Zinc has a brilliant metallic lustre and a bluish white colour. It is so hard as to be filed with some difficulty, and its toughness is such as to require very considerable force to break it when the mass is considerable. The specific gravity of zinc varies from 6.86 to 7.21. It undergoes little alteration, even by the combined operation of air and moisture, at common temperatures. When heated to between the temperature of boiling water and 300° Fahr. it becomes both malleable and ductile, so that it may be rolled into sheets and drawn into wire. It fuses at 773° Fahr., and when cautiously cooled crystallises, assuming the prismatic form. Exposed to a white heat, out of the contact of air, it sublimes and is condensed unchanged.

The ores of zinc comprise the *Sulphuret*, or *Blende*; the *Oxisulphuret*, or *Voltzite*; the *Carbonate*, or *Calamine*; the *Hydrous Carbonate*; the *Sulphate*; the *Phosphate*; the *Silicate*; the *Hydrous Silicate*; the *Aluminate*; the *Oxide of Zinc and Manganese*; the *Sulphuret of Zinc and Iron*. Some of these ores are crystalline, some massive.

Oxide or *Protoxide of Zinc* exists in the native carbonate. The protoxide is inodorous, insipid, insoluble in water, and infusible by heat: it combines readily with acids, and also with the alkalies, ammonia, potash, and soda. It consists of O^1 [illegible]. *Peroxide of Zinc* is white, inodorous, insipid, and decomposes spontaneously when kept moist or when heated. It is also decomposed by acids. *Chloride of Zinc*, formerly Butter of Zinc ($Chl.^1 Z$), is colourless, has a very styptic taste, is readily soluble in water, and crystallises from it with difficulty; it is very volatile at a red heat. *Bromide of Zinc* is a crystalline substance, which has a sweetish astringent taste, and is very deliquescent; it becomes dry when heated, and fuses at a red heat; it consists of $B^1 Z^1$. *Iodide of Zinc* ($I^1 Z^1$) is readily obtained by heating iodine and zinc together in water. *Sulphuret of Zinc* (S^1 [illegible]) is a precipitate which presents different colours according to the mode of preparation. *Phosphuret of Zinc* is a silvery white, metallic-like substance. *Seleniuret of Zinc* is a lemon-yellow powdery substance.

Nitrate of Zinc presents the form of colourless crystals, deliquescent, very soluble in water and alcohol. *Sulphate of Zinc*, the salt of zinc most extensively employed both in medicine and the arts, is procured in the form of crystals. It has a disagreeable metallic taste. It is not altered by exposure to the air, but if moderately heated loses its water of crystallisation, and when subjected to a high temperature is entirely decomposed, the acid being expelled, the oxide only remaining. This salt is very soluble in water at 60°, and much more so in boiling water. There is an impure sulphate of zinc used in the arts, under the name of White Vitriol: it is a colourless granular mass, obtained by the oxidisement of the natural sulphuret of zinc, or Blende. *Carbonate* and *Acetate of Zinc* are known, but are not much employed. The Salts of Zinc are usually soluble in water, colourless, and have an unpleasant metallic taste. Potassium and sodium form with [illegible]

brittle alloys, decomposable by exposure to air and moisture. Zinc combined with copper forms brass, and with iron yields a very hard alloy. If plates of hot iron be dipped into melted zinc, they acquire the appearance of tin-plate, and the iron is prevented from rusting. Sheet-zinc is now largely employed for lining water-cisterns and covering buildings.

ZINGIBERA'CEÆ, a natural order of plants belonging to the class of Endogens. The plants belonging to this order are herbaceous, possessing a creeping and often jointed rhizoma. Nearly all the species are tropical plants, and by far the greater number inhabit various parts of the East Indies; they are also found in Africa and America.

The plants belonging to this order are also employed to a considerable extent in medicine and as condiments, on account of their aromatic stimulating properties. [AMOMUM; CARDAMOMS; CURCUMA.] Of the various genera belonging to this order, probably the most important is the *Zingiber officinale* (Ginger), which is extensively cultivated in China, Java, and the East and West Indies.

ZIRCO'NIUM, a peculiar metal obtained from the earth or metallic oxide *Zirconia*. Under the burnisher it assumes the lustre of iron, and is compressed into scales resembling graphite. When heated in the air, even below redness, it takes fire; and by combining with oxygen is converted into oxide of zirconium, or Zirconia. *Zircon*, the mineral from which the earth and the metal have been named, occurs in prismatic crystals, and consists of zirconia and silica.

ZITTAU. [LAUSITZ.]

ZI'ZYPHUS, a genus of plants belonging to the natural order *Rhamnaceæ*. *Z. vulgaris*, the Common Jujube, is a native of Syria, from whence it has been introduced into Europe. It is now cultivated in many parts of the south of Europe, where its fruit is known by the name of *Jujube*.

ZOANTHARIA (animal flowers, from the Greek ζῷον, and ἄνθος), the third class of true Zoophytes in the arrangement of De Blainville.

ZODIAC is a name given to a zone of the visible heavens, extending in breadth to certain equal distances on both sides of a great circle of the celestial sphere, in the plane of the ecliptic or of the earth's orbit produced. At present this circle makes with the plane of the earth's equator an angle equal to about 23° 27′ 35″, and it is divided into twelve equal parts, called *Signs*, which receive their denominations from those of the figures intended to designate the constellations or groups of stars about it. Most of the figures being those of animals, the name of zodiac (from ζῳδίον, *zódion*, the diminutive of ζῷον, an animal) has, in consequence, been applied to the zone.

ZO'ILUS, a Greek rhetorician and grammarian, probably a native of Amphipolis on the Strymon. He appears to have lived during the period that followed the death of Philip of Macedonia, that is, after B.C. 336, for he wrote a history which came down to the death of that king. Zoilus was originally a slave, but he afterwards acquired great reputation as a rhetorician. He attacked Homer for introducing fabulous and incredible stories in his poems, and also Plato and Isocrates. For this reason his name appears to have become proverbial for a detractor in general.

ZOMBOR, a town in the county of Bacs in Hungary, is situated in 45° 45′ N. lat., 19° 12′ E. long., at the distance of half a league from the Danube, in a plain on the banks of the Francis Canal. The houses are mostly low and covered with thatch. Population, 18,000.

ZONE (the Greek ζωνη, 'a belt'), a portion of a sphere intercepted between two parallel lines. When, on the globe of the earth, one plane is the equator, and four others are drawn parallel to it, two of which contain the circles in which the sun is vertical at the summer and winter solstices, and the two others, the circles of which are as far distant (on the earth) from the poles as the former are from the equator, the earth is divided into six zones (the polar segments being called by that name as well as the others). Of these the portions which contain the two poles are called the *North* and *South Frigid Zones*. Throughout these zones the sun never rises during a part of the winter, and never sets during a part of the summer. The parts intercepted between the arctic circle and the summer solstice parallel, and between the antarctic circle and the winter solstice parallel, are called the *North* and *South Temperate Zones*. In every part of these there is always a rising and setting of the sun for every day in the year; but in no part of them is the sun ever vertical. The parts between the summer solstice parallel and the equator, and between the winter solstice parallel and the equator, are called the *North* and *South Torrid Zones*. In these there is always night and day, and at every point the noonday sun is vertical twice in the year.

ZOOCARPES, the name given to certain organised bodies which have been variously classed by botanists and zoologists as animals or plants, and by some as partaking of the characters of each.

ZOOLOGY (from ζῷον, *zōon*, an animal, and λόγος, *logos*) literally means a discourse concerning animals, and is the science which teaches the nature, properties, and classification of the subjects of the animal kingdom. [ANATOMY, COMPARATIVE.]

ZOO'PHYTA (from ζῷον, *animal*, and φυτόν, *plant*). This is the title most generally employed for the radiated and phytoid forms of animal life, included by Linnæus in his great divisions of *Vermes*, viz. *Vermes Mollusca*, *Vermes Lithophyta*, and *Vermes Zoophyta*.

ZOROASTER, or ZERDUSHT, the founder of the religion of the Parsees, was born about 589 B.C., at Urmia, a town of Azerbijan. Nothing certain is known of his life. He taught that God existed from all eternity, and was like infinity of time and space. There were, he averred, two principles in the universe—good and evil. Light was the type of the good principle, darkness of the evil principle. Zoroaster affirmed that God said to him, 'My light is hidden under all that shines.' Hence the disciple, when he performs his devotions in a temple, turns towards the sacred fire that burns upon its altar; and when in the open air, towards the sun, as the noblest of all lights. After his death the religion he introduced was disturbed by schisms, and it gradually sank to

a mere idolatrous worship of the fire and the sun. The worshippers were persecuted when Mohammedan rulers had possessed themselves of Iran. They at last left the country and settled in Guzerat, where they are to this day, but greatly diminished in number. *Zend-Avesta*, 'the living word,' is the name of the sacred books of the Parsees. They are written in the language called Zend, and are attributed to Zoroaster. They consisted of 20 sections, of which we possess only the 20th. They may contain some of his doctrines, but are certainly not of an earlier date than the Sassanidæ.

ZO'SIMUS, a Greek historian of the time of Theodosius the younger (A.D. 408–450). Zosimus is the author of an historical work still extant, in six books, which appears to have been written after the year A.D. 425. It begins with the history of Augustus, and ends at A.D. 409, when Rome was besieged by Alaric a second time, and Attalus was declared emperor. The narative of Zosimus is generally clear.

ZUG, the smallest of the Swiss cantons, is bounded N. by the canton of Zürich, E. and S. by Schwyz, and W. by Luzern and Aargau. It is about 14 miles long and 10 broad. The area is 85⅓ square miles, and the population at the end of March, 1850, was 17,463, all Catholics but 139. [SWITZERLAND.]

ZUIDER ZEE. [NETHERLANDS.]

ZÜRICH, a Swiss canton bounded N. by the canton of Schaffhausen, and the grand-duchy of Baden; E. by Thurgau and St. Gall; S. by Schwyz and Zug; and W. by Aargau. The territory of Zürich lies in the basin of the Rhine, all its watercourses flowing northwards to that river. The area is 684 square miles, and the population at the end of March, 1850, was 250,698. There are no high mountains in the canton; but several ridges of hills, some of which attain a height of 2700 feet, run from south-east to north-west, enclosing valleys drained by the Thur, the Töss, the Glatt, and the Limmat, which last forms the outlet of the lake of Zürich. [SWITZERLAND.]

Zürich, the head town of the canton, situated at the north-west extremity of the lake of Zürich, is divided by the river Limmat into two nearly equal parts; of which the one on the right bank is called the Grosse Stadt, and the other the Kleine Stadt. The Grosse Stadt is built on the slope of a hill called the Zürichberg; the Kleine Stadt lies on more even ground between the Limmat and the Sihl, just above the confluence of these rivers. Both towns were formerly surrounded by ramparts and ditches, but the works were razed in 1833. The streets are mostly narrow and irregular, the houses high, massive, and ancient looking. The cathedral is a fine old building of the 11th century. Zürich is a thriving busy town. Its silk and cotton manufactures give employment to many thousand work-people in the town and neighbourhood. The population, according to the census of March, 1850, was 17,040. It is situated 63 miles E.N.E. from Bern.

The only other town of importance is *Winterthur*, situated in a plain 12 miles N.E. from Zürich. It is a regularly built town, one of the handsomest and neatest in all Switzerland, and has a population of 5341.

ZUTPHEN. [GUELDERLAND.]

ZWINGLI, or ZUINGLI, ULRICH, was born in the canton of St. Gall, in Switzerland, Jan., 1484. He studied first at Basel, and then at Bern, whence he went to study philosophy at Vienna. On his return to Basel he went through his theological studies under Thomas Wyttenbach. He was ordained priest in 1506, and was appointed to the parish of Glarus. He applied himself to the study of the Scriptures in the Hebrew and Greek texts, and that of the early fathers of the church. He early entertained objections against the government and discipline of the church of Rome.

After having filled his post at Glarus for ten years, he was appointed, in 1516, preacher to the monastery of Einsiedlen. There he preached more freely than he had done at Glarus, entreating his audience to seek forgiveness through the merits of the Saviour alone, and not through the intercession of the Virgin and other saints, and to consult the Scriptures as the only safe rule in matters of faith.

Besides preaching these doctrines, he publicly denied the right of the Pope to decide in religious questions, and strenuously opposed the sale of Indulgences. The court of Rome brought a charge of heresy against Zwingli, and threatened him and his followers with excommunication. In January, 1523, a great council was held in the town-hall at Zürich, and another in October, in both of which the followers of Zwingli had a great majority. In 1524 the great council ordered all the pictures, statues, relics, offerings, and other ornaments, to be removed from the churches, and in Jan., 1525, the mass ceased to be celebrated at Zürich. Some of the other Swiss cantons adhered to the Roman Catholic religion, and in 1531 war actually broke out between the Catholic and the Reformed cantons. The five cantons of Luzern, Zug, Schwyz, Uri, and Unterwalden, declared war against Zürich and Bern, and their troops advanced to Cappel, where a battle was fought Oct. 11, 1531. The men of the five cantons, nearly 8000 strong, defeated the Zürichers, most of whom were killed and the rest dispersed. Zwingli himself fell by a mortal wound. Zwingli's works were collected and published at Zürich in 3 vols. 4to., in 1581. His followers were called *Zwinglians*.

ZWOLL. [OVERYSSEL.]

ZYGOPHYLLA'CEÆ, a natural order of plants belonging to Lindley's Gynobasic group of Polypetalous Exogens. In this order are included 17 genera, of which one of the most important is GUAIACUM.

THE END.

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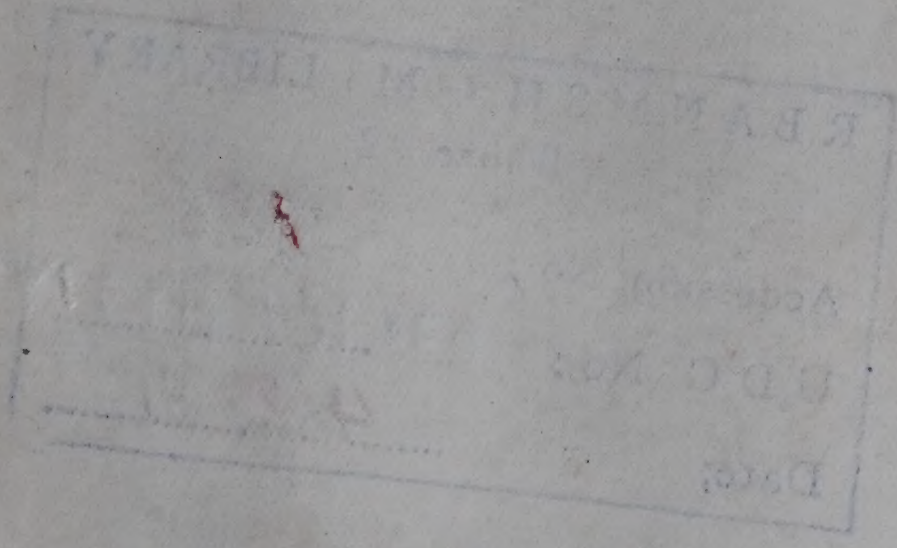

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